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THE AUTOMOBILE

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REDEEMING THE DESERT BY AUTOMOBILES

By JAMES W. ABBOTT.

RETURNING from a visit to the wonderful new mining camps in Nevada, and the thing which of all others astounded me most was the part the automobile has played in the discovery and development of those mines and cities. Without this modern device, unknown when Cripple Creek and Leadville were developed, it is probable that there would exist to-day no Goldfield or Bullfrog district, and that Tonopah would hardly have yet outgrown the crude hamlet stage.

The discovery of the Mizpah at Tonopah was heralded to the world in 1900, and work was soon begun in a very primitive way. It was then located sixty-five miles from a tortuous narrow gauge railroad which had been expiring of dry rot for years. Stage communication was established from this narrow gauge road to the new camp and great mule teams hauled the ores out and supplies in. But the process was slow and the experience of the limited number of men with means who went in was painful and discouraging because of the desert conditions. It so happened that this wonderfully rich property passed into the control of strong financial interests which wisely, about three years ago, constructed a railroad line into Tonopah, primarily for their own purposes. This railroad completed and opened about two years ago to Tonopah, furnished the base of operations to mining men. Prospectors venturing out with burros and mule teams and carrying their own water and supplies for man and beast, had found

TONOPAH, NEVADA, AS IT APPEARED IN 1901, SOME TIME PREVIOUS TO THE ADVENT OF THE AUTOMOBILE.

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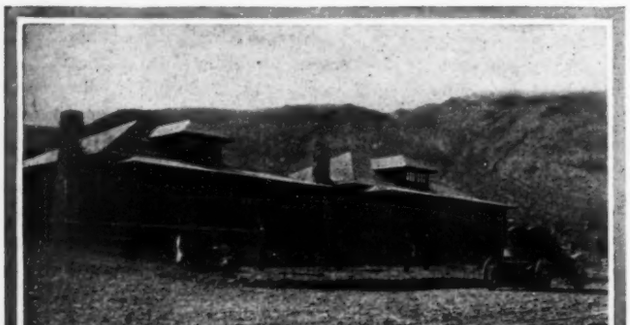
THE NEXT STOP IS BEATTY, 35 MILES DISTANT?

a rich mine where Goldfield now is. The excitement induced by the discoveries already made stretched to the mining centers of the country, and mining men began to come in from everywhere. A man of foresight and nerve saw the opportunity. He imported, at great expense, an automobile and attempted to furnish these newcomers an opportunity to go from point to point rapidly and comfortably. At first he had many discouraging experiences.



WHAT IS HOME IN THE DESERT WITHOUT AN AUTO?

The automobile, true to the instincts of its species in earlier days elsewhere, would balk and leave its occupants a-foot out on the desert far from water and the help of man. But before long these weaknesses, peculiar to the existing physical conditions, were studied out and overcome until soon the automobile became almost as certain in its performances as the steam locomotives.

Men of wealth came in in greater and greater number, many of them unaccustomed to hardship and who could not possibly have survived the terrors of the desert had they attempted to visit mining properties by animal conveyance. The automobile met their needs. Roads existed to every new discovery, and if they didn't exist before the discovery was made, could be opened almost without cost or delay. Men could sleep and eat and exist in comparative comfort at Tonopah, while between the rising and the setting of the sun they could visit distant points and inspect the marvelous finds. Properties were bought, new work started, activity and excitement increased. Soon a regular line of automobiles was established from Tonopah to Goldfield, a distance of 30 miles, and later, after the first discoveries had been made in the Bullfrog district, the line was extended to Bullfrog. To-day it is estimated that in these new camps in Nevada there are not less than 100 motor cars for public or private use.

BUILT OF TIMBER COSTING $150 PER 1,000 FEET.

The regular line from Goldfield to the Bullfrog district, the Nevada Mobile Transit Company, operates at least one machine each way daily, but there are generally one or more special cars and sometimes as many as six on the road in one direction at one time. The distance between Goldfield and Rhyolite is 75 miles. Starting at Goldfield the first stop is made at the half-way camp where a German family live in a tent and furnish the traveler with meals at $1.00 per, and beer at 75 cents. Crude as the accommodations are they are very gratefully appreciated. Beatty is the next point at which a stop is made, five miles before Rhyolite is reached. Rhyolite is at present the principal town in the Bullfrog district, and has a population of at least 5,000 people.

High Toll Charges and the Reasons Therefor.

The automobile company has built its own road from Goldfield to Beatty and operates it as a toll road. The toll gate is at the half-way tent already described. Here is erected a large board bearing in conspicuous letters the following legend:

GOLDFIELD AND BULLFROG TOLL ROAD.

Automobile and one	$15.00
Each additional person	5.00
Single-horse or two-horse team and light wagon	25.00
Two-horse team and heavy wagon	50.00
Each additional animal	5.00

As the old county road between these points is still operated and in fair condition for wagon travel it may be readily believed that the toll road route lacks fascination for freighters or the few travelers with animals. Indeed the purpose of putting the toll so high was to make the route really an exclusive one for automobiles. I am told that the privilege of moving on that road without obstruction from slow vehicles going in the same direction and with the certainty of meeting few en route, induces the owners of private automobiles to accept the privileges it affords and pay the exorbitant tolls charged.

This road for most of its distance was very rapidly constructed; having been surveyed and staked, the road was outlined by an instrument called a "torpedo," which is pulled by about twenty animals and plows its way through the desert removing sage brush and other vegetable growth as it advances. The road as it is laid out has few turns and long tangents. A very interesting phenomenon to me was the undulating borders of this road due to the lateral oscillations of the automobiles in their swift flight. I took a picture of the road showing this manifestation and it seemed to me that it might very appropriately be termed a "hoochee koochee" road.

The entire 75 miles between termini is often made in four and a half hours by the regular cars. I was told, the day I went over it last, that a private car made the distance from Goldfield to Beatty that day, 70 miles, in just two hours and ten minutes.

What It Costs the Passenger to Travel.

The fare between Goldfield and Rhyolite or Goldfield and Beatty is $25.00 each way. The fare from Tonopah to Manhattan, a distance of about 45 miles, is $20.00 each way in the automobiles. Of course stage fares are somewhat less and many travel by private conveyance or freight teams. The automobiles are exceedingly comfortable and readily hold three persons on each of their three seats, so that there are eight contributing passengers on

each trip when the car is full who "cough up" among them $200.00, a very nice little pot to be absorbed by the company.

Three railroad lines are in process of construction which will connect Tonopah with Rhyolite and existing motor lines will have no further *raison d'etre*, but the demand for the machines will increase, rather than diminish, and the men who have thus anticipated the needs of this rich desert section will be richly rewarded. News comes into Tonopah from some other camp of another fabulous find more or less distant. In another hour every loose machine in camp has been hired to visit the new discovery on terms varying from $75.00 to $125.00 per diem.

I saw some jack rabbits on the desert, but for every rabbit I saw a hundred empty gasoline cans, thrown where they were emptied and left where they fell. It is said, at first, so great was the need of water holders in this region that empty gasoline cans readily brought $1.00 each. That day has passed and the gasoline cans so liberally strewn everywhere are free to him who needs them.

Water still sells at from $1.00 to $2.00 per barrel and sometimes looks very cheap at that price to a man whose own lips are parched with thirst, or who sees his animals famishing for water, when none is to be had at a less price.

The Region's Wonderful and Rapid Development.

The development of the region has been marvelously rapid and, considering the excessive cost in every way, the existing conditions are luxurious. Many of the buildings are of stone and would do credit to a modern up-to-date city. Very many mining men own their own automobiles and the demand for motor cars will be very great. The claim is already made in Tonopah, now a city of perhaps 7,000 people, that more automobiles are owned there than in any other town of its population in the United States. Of course the comparatively excellent road conditions in that region have been largely responsible for the automobile use thus far. A large part of the desert of Nevada is composed of detritus from the volcanic rocks, which lends itself readily to the making of a hard and fairly dustless road bed. Rain falls occasionally, and between the rain and the traffic the roads get hard and smooth under the wheels of the automobiles. There is not a stretch of sand anywhere between Goldfield and Rhyolite. The absence of sand makes traveling on these roads very rapid.

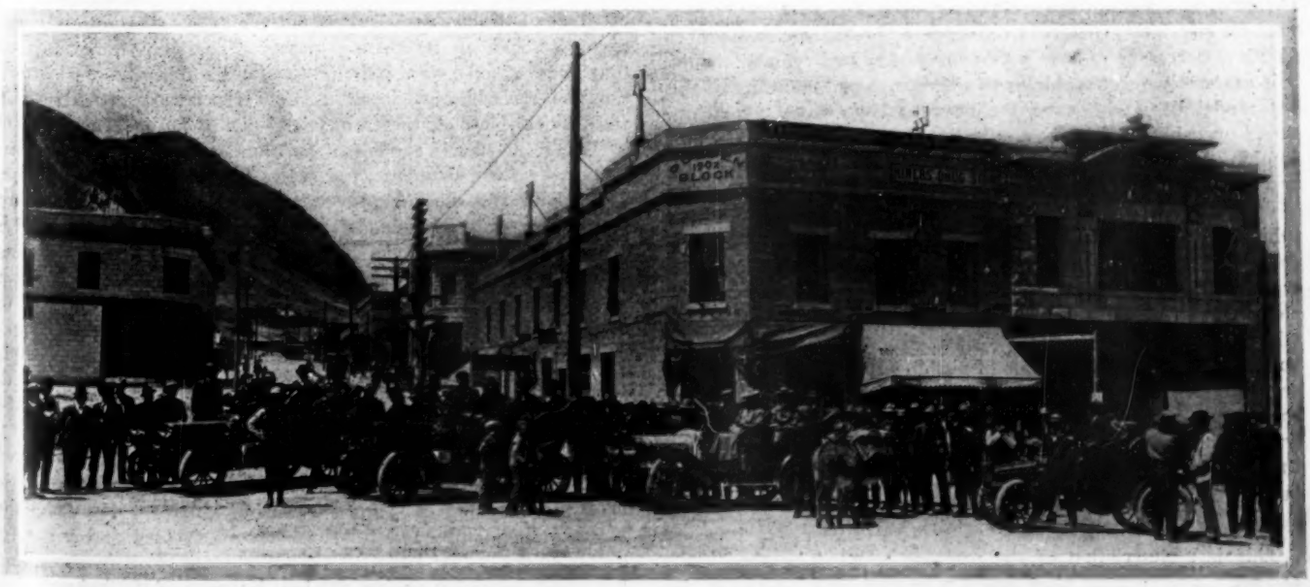
You asked me once to write for THE AUTOMOBILE an article giving my views why the demand for the automobiles in the far West would increase rapidly. This paper will, perhaps, answer that for one type. At another time, perhaps, I will be able to take up another section.

A "HOUCHEE-COUCHEE" ROAD IN THE DESERT.

AUTOMOBILING IN DEATH VALLEY.

Charles E. Knox, formerly of Berkeley, Cal., now of Independence, a suburb of Kansas City, had a thrilling prospecting trip in the Death Valley not long ago. An axle of his car broke and, had it not been for the fact that he carried a spare one and was able to effect repairs quickly, his party would have perished. The temperature at the time was 130 degrees. A large part of the valley is below sea level.

Nearly the whole afternoon was consumed in repairing the machine. In order to get it off the ground the men gathered up stones to place under the machine. These stones were so hot that one of the men burned his arm, which gave him much trouble. At 4:30 in the afternoon they were again ready to start. At 6 o'clock in the afternoon they reached the Furnace Creek ranch of "Borax" Smith. Although the mercury still registered 109½ degrees and the wind was blowing twenty-five or thirty miles an hour, Mr. Knox declares that it was delightfully cool, compared to the furnace-like heat in which they had spent the afternoon.



SOME OF THE "REDEEMERS OF THE DESERT" IN A STREET OF THE TONOPAH OF TO-DAY.

MOTORCYCLES POPULAR IN GREAT BRITAIN.

By JOSEPH A. MACKLE.

LONDON, June 7.—Perhaps in no other country has the use of the motorcycle become so general and so popular as in Great Britain. Whether it is on account of the suitability of the roads—for if not perfect, they are at least of uniformly fair quality—or because of the Englishman's love of sport (and there is nothing in this direction to surpass motorcycling), the fact remains that there are in England more motorcycles than cars, more motorcycles than there are in France, and presumably more than in the United States. A recent census showed that there were more than 35,000 motorcycles registered, and this number will probably be increased to forty-three or forty-five thousand by the end of the year.

Legislation Prior to 1896.

Owing to adverse legislation, which prevented the rational use of motors in England before 1896, France and other automobile countries gained an advantage which has taken England ten years to overhaul, at any rate as far as motor cars are concerned. As regards motorcycles, it is averred that British productions have for several years surpassed those of France, for even if French and Austrian machines have proved victorious in international contests, where speed is the essential qualification, in reliability trials the British motorcycle has generally come out best, and to the average rider reliability is of far more importance than speed. Most of the British cycle makers—and their name is legion—have made an attempt at the manufacture of motorcycles at some time or another. All have begun with an engine slung onto a strengthened bicycle frame, but while many have gone on and evolved their present creditable productions, others have become disgusted with their failure to achieve immediate success and have become dead to the motor world.

National Preference in Machines.

French motorcycle manufacturers seem to favor an engine of about 2 3-4 horsepower; and to an English reader of the doings of the American motorcycle the average power of such machines seems to be rated at 1 3-4 horsepower—presumably on the same basis of reckoning as a well-known 30-horsepower British car which is guaranteed to give 60 horsepower on the brake. In England there has been a gradual increase of power which has been very marked. Up till 1902, 1 1-2 and 1 3-4 horsepower were standard, and the advent of 2 3-4-horsepower motorcycles in 1903 was considered to mark the limit of power which could be desired. The past two seasons have, however, seen the 3 1-2-horsepower machine rise into popular favor, while to be "in the fashion" in 1906 it is necessary to have a 5-6-horsepower two-cylinder mount. It is extremely questionable as to where the need or utility of this last model lies; with even the heaviest rider, such a machine would probably do forty-five miles an hour on the flat and climb anything short of a mountain, and this is far more than the average rider requires.

The motorcycle is, or should be, essentially a handy or simple vehicle, departing from the pedal cycle as little as possible in these qualities. But with the rise of power, the weight has greatly increased, until now these latest models will probably scale over 220 pounds, and this great weight necessitates a free engine clutch, as otherwise the labor of starting such a monster on the slightest up grade by the usual methods of pushing or pedaling would be a severe strain on most riders. After a free engine comes a two-speed gear, and the low gear then demands the introduction of water cooling. Thus we evolve a one-seated motor car, with all the complication but with none of the comfort or stability of the larger vehicle.

Machines of Various Weights.

This is a description of the machine adopted by the "heavy brigade"; the average rider steers a middle course between this and the production of the light-weight party. This last was at first a kind of moderator of the ideas of the heavy brigade; finally it evolved a machine weighing complete about 80 pounds. This machine was all right in its way, but the engine and fittings were necessarily of light construction and hardly suited for the every-day rider. The average British motorcycle could be taken as about 3 horsepower, with the air-cooled engine—for practically nothing has been done in the way of water-cooled machines—set vertically at the bottom bracket, driving the rear wheel by a leather belt. This last fact is rather interesting.

Until about two years ago belts were, on the whole, very unreliable, and the satisfactory nature of the chain drive, provided a clutch or other slipping medium was fitted to take up the shock, would no doubt have made this form of transmission soon supplant the belt, had it not been that two or three new forms of belt were marketed at the time, and these have turned the tide in favor of belt-driven transmission again. The belt drive is satisfactory even for the highest powered machines, and the use of the chain is confined to comparatively few machines. Ignition is generally effected by a coil and storage battery, but magneto—both high and low tension—is growing in favor.

The question of having two-speed gears on machines of moderate power is under general discussion at the present time. With a 2-3-4-horsepower machine an efficient two-speed gear giving, say, ratios of 1 to 4 1-2 and 1 to 7 of road wheel to engine revolutions, would enable a speed of 35 miles an hour to be reached, and yet any ordinary hill to be surmounted without pedal assistance—for these adjuncts are still fitted to most machines. In all probability the coming season will see a big increase in the number of machines fitted with two-speed gears—generally a simple epicyclic gear in the rear hub.

As regards price, the average 3-horsepower machine of British make sells at about $200, but reliable machines, though of course not built with such attention to details, can be had down to $150. Last year the largest firm of motorcycle makers in Great Britain reduced the price of its standard 3 1-2-horsepower model to $130, but it is not likely that any other maker will drop as low as this figure, at any rate for some time to come.

Cycle Built for Two.

Whatever be the opinion as to whether British motor bicycles are best or not, it cannot be denied that as regards motor cycles for two persons, Britain has a big lead. The "tricar" has a host of enthusiastic adherents and is the great rival which retards the progress of the two-seated runabout. Like the motor bicycle, the tricar has had an interesting history. The first "forecars" (as they were styled) were built in 1902 and were, of course, evolutions of the old quadricycle. These forecars were convertible from motor bicycles, the front wheel of this latter being replaced by two front wheels and a seat for the passenger. The convertibility was soon abandoned; a water-cooled engine, speed gear, chain drive and other improvements were added by degrees, till now some of the 1906 models possess all the requirements of a $5,000 car. There is undoubtedly a big sphere of activity for this type of vehicle, and its general handiness, combined with its light weight and consequent low fuel and tire bill, will cause it to always have a big following. A tricar with 6-8-horsepower two-cylinder engine, water-cooled with forced circulation, three speeds forward and reverse, irreversible steering, well sprung and with big tires, sells at about $600, but less powerful machines can be had for $400.

The ruling motorcycling body is the Autocycle Club, evolved from the A. C. G. B. I. Before the formation of the Autocycle Club there was in existence in London already a big club—the Motorcycling Club—and this has refused to bow and pay allegiance to the ruling body. This unfortunate spirit of opposition has acted somewhat against the best interests of the industry, but no doubt both clubs will settle their differences amicably.

SPECIAL AUTO STEELS AND THEIR PROPERTIES*—II.

By RENE M. PETARD.

HAVING thus succinctly exposed the general characteristics of the different classes of nickel binary steels, we go a little deeper into the subjects and, considering various definite percentages amongst the principal ones, give some figures concerning their physical properties, which we owe to the courtesy of one of the most important makers of these steels in France.

One to One and One-half Per Cent. Nickel Steel.

These steels are the softest among those of low nickel percentage which we before classed as casehardening and tempering nickel steels. They can be forged with facility either cold or hot, in a manner similar to soft carbon steel, but are less fragile and can more satisfactorily be used without heat treatment; they stand annealing or water or oil tempering, as well as casehardening, and possess to the utmost the fibrous texture previously mentioned. Their main characteristics are:

	Elastic limit.	Tensile strength.	Elongation.
Annealed at 900° C.	.26 kilos per mm.²	40 kilos per mm.²	30 p.c.
Tempered in water at 900° C.	.34 kilos per mm.²	55 kilos per mm.²	18 p.c.

They are especially well adapted for difficult or complicated forgings, intricate sheet-metal stamping in all thicknesses, manufacture of rivets, and similar work in which ductility must be accompanied by fairly great safety.

Three Per Cent. Nickel Steel.

These steels are the softest among those of low nickel permost important classes on account of the widely different uses to which they can be put with equally good results.

They can be used in two different manners, without heat treatment, that is in their natural state (a)—they are then termed "constructional nickel steels"—or else after heat treatment (b), when they are used to form finished parts for machinery of all sorts.

(a) Three per cent. nickel steel in natural state, such as sheet metal, rivets, angle or other rolled sections.

Used in its natural state, in the forms enumerated in the table at the end of this section, the 3 per cent. nickel steel presents the advantage, over carbon steel, of a higher resistance, with the same hardness of surface. It has the further advantage of being much less inclined to develop cracks when submitted to heavy stresses such as when sheared or punched. In this respect its two most important qualities, differentiated by their percentage of carbon, and designated by their tensile strength, give the following comparisons with carbon steel of corresponding value:

Three per cent. nickel steel of 50 kilos t. s. will compare with 42 kilos t. s. carbon steel, and 3 per cent. nickel steel of 60 kilos t. s. will compare with 50 kilos t. s. carbon steel.

Noting further that for carbon steel the elastic limit is about 55 per cent. of the tensile strength while it is 70 per cent. for nickel steel, it will be seen that for the same safety as regards liability to develop cracks, the possible saving in weight when calculating a part upon the basis of its elastic limit, which is the only interesting basis, will be more than one-third. The 60 kilos t. s. nickel steel can be worked cold or hot, and can be rolled with perfect safety into the most complicated profiles or in sheets of any thickness. It can be successfully used for work where great safety is required combined with lightness, such as frames, supports, light boat hulls, and has even been extensively used since its development into a commercial article for bridge building. In the use specified for light boat hulls it presents the further advantage of a resistance to corrosion much greater than that of carbon steel.

The 50 kilos t. s. nickel steel is still softer than the 60 kilos grade; it has given wonderfully satisfactory results for high-duty boiler construction, as there again the resistance of nickel-steel to corrosion has added its advantages to those of the greater strength. In rivet form it is as advantageous as in sheet metal form on account of its high resistance combined with its malleability; the rivet heads are very easily and accurately formed, either hot or cold, and can easily be cut off with a chisel when it is necessary to dismantle the work, this being a precious quality, especially when compared with the performance of rivets made of 6 per cent. nickel steel, which can only be removed by melting with electrical heat. The malleability of this metal in sheet form can be well illustrated by the fact that after quenching in water, at a temperature of 800 degrees C., without annealing, a sheet could be folded right over itself with a diameter of 1-2 inch in the fold.

Following are characteristics of rolled 3 per cent. nickel steels in natural state:

	60 Kilos T. S. Steel.			50 Kilos T. S. Steel		
Thickness.	Elastic Limit.	Tensile Strength.	Elongation.	Elastic Limit.	Tensile Strength.	Elongation.
1.5 to 2 mm	.42	60	13 p.c.	35	50	16 p.c.
2 to 3 mm	.42	60	14 p.c.	35	50	17 p.c.
3 to 5 mm	.42	60	16 p.c.	35	50	19 p.c.
5 to 8 mm	.42	60	19 p.c.	35	50	23 p.c.
8 and over	.42	60	23 p.c.	35	50	28 p.c.

(b) Three per cent. nickel steel, machined, and heat treated. For parts to be machined and to be used as components in mechanisms submitted to the usual strains of moving machinery, it is advantageous to submit the 3 per cent. nickel steel of the two grades considered in section (a) to a special heat treatment consisting in oil-tempering at a high temperature, followed by annealing at a low temperature. This treatment can be followed for rough parts, for partly finished, or for finished parts, and does not interfere with the machining; it is simply intended to relieve all the internal strains which may have previously been set up in the preceding treatments of the metal. It is, however, more advantageous to submit to this treatment the parts when rough cut, before the finishing cuts are taken, for two reasons: first, to possess a greater chance of the treatment reaching clean through the part without interference from the hard exterior skin; second, to reduce the chances of warping of the finished parts when finally tempered for hardness. For the same reasons parts to be bored out should undergo the boring process before being submitted to the heat treatment.

Following are the characteristics of the treated 3 per cent. nickel steels:

	50 Kilos T. S. Steel.			60 Kilos T. S. Steel.		
Treatment.	E. L.	T. S.	Elong.	E. L.	T. S.	Elong.
Annealed at 900° C.	.35	50	25 p.c.	42	60	20 p.c.
Tempered in oil at 900° C. and annealed at 550° to 600° C.	.48	56	20 p.c.	58	68	15 p.c.

From these figures it will be seen that the characteristics of the metal are greatly improved by the treatment, and that, considering its malleability, it can be submitted to very high duty; besides, the treatment still increases the fibrous texture of the material, rendering it practically unbreakable, it being a current practice for testing to fold over and twist in the oddest shapes shafts of large diameter without heating. Drop-hammer tests on notched test bars have shown this steel so treated to resist strains four to eight times greater than those under which the corresponding quality of carbon steel failed. The casehardening properties of this steel have already been dealt with in the first part of this study.

The quality of this steel has caused it to be extensively used for high-duty parts, submitted to heavy alternate stresses or great vibrations, such as axles, crankshafts, turbine or dynamo shafts, piston rods, and the like.

Five Per Cent. Nickel Steel (4.5 to 6 Per Cent.).

This is properly the typical automobile steel. It has most of the advantages of the 3 per cent. steel and much greater strength. It is the proper steel for manufacturing in quantities, as it is now a

*Continued from page 762, issue of May 10, 1906.

perfectly commercial all-around steel, of reasonable price, and which can be surpassed by other more complex and costly steels only for special purposes. It possesses, at their maximum, all the good qualities of the low percentage steels, and its absence of fragility is exceptional, it being in this respect 18 to 20 times superior to the corresponding carbon steel, as shock and alternate-stresses tests have proven. It is the most generally adopted by French makers and is used, for instance, in the manufacture of shafts, crankshafts, axles, spindles, hubs, gears, connecting rods, spring shackles, and pedals. In sheet metal form, without heat treatment it forms probably the strongest frames, when absolutely special vehicles are not considered, and permits of considerable reductions in the proportions of the parts. Its characteristics are as follows:

	60 Kilos T. S. Steel.			70 Kilos T. S. Steel.		
Treatment.	E. L.	T. S.	Elong.	E. L.	T. S.	Elong.
Annealed at 900° C.	44	62	20 p.c.	52	72	15 p.c.
Tempered at 850° C. and annealed at 550° to 600° C.	62	72	15 p.c.	75	85	12 p.c.

Passing now to the second class of nickel steels as we considered them in the first part of this study, we shall first consider the 10 to 12 per cent. nickel steel.

Ten to Twelve Per Cent. Nickel Steel.

These steels form a class by themselves, entirely distinct from that of the low or of the high tensile steels. They can be worked hot with the same facility as the usual grades of hard carbon steel, and can be heated to temperatures as high as 1,000 degrees C. without the least damage.

They possess the curious property, which they share with various grades of tool steel, of hardening by mere cooling in the air, whenever they have been heated to a temperature of more than 600 degrees C. They are then unworkable, whatever the tool used may be. In this state they have a tensile strength which can reach as high as 200 kilos per sq. mm. In order to machine them when in this state they must be softened. To do this it is merely necessary to heat them at a temperature anywhere between 400 and 550 degrees C. After this treatment they can be worked in the ordinary manner, but are naturally a little harder than the usual steels. It is in this state that it is proper to use them in their practical applications, as, although their tensile strength is decreased by the annealing process, their elastic limit and their elongation, which are the most important characteristics for practical service, are raised and the desirable fibrous texture is obtained, which does not exist in the harder state.

Their characteristics are as follows:

Treatment.	E.L.	T.S.	Elong.
Heated to 900° C.	72	140	6 p.c
Heated to 900° and then annealed to 550° C.	80	95	12 p.c.

The applications of such steels are the same as those of the lesser t. s. materials, but the increased difficulty in machining prevents their extensive use for ordinary mechanisms. They are, however, often used on specially high-grade cars and in special instances in standard machines; for instance when extra stiff sheet metal members or tubes are required.

Although it is a little out of the scope of this article, the process used in French factories for ascertaining with safety the annealing temperature of this steel is so interesting that it will be described here.

The parts to be treated are placed in a comparatively cold furnace (a little over dark red) and are left until their temperature begins to rise appreciably. They are then rubbed from time to time with a piece of pine wood, well dried, and the behavior of the wood is a safe thermometer.

At 500 degrees C. the wood gives out fairly thick smoke, and the gum which it contains and which is affected by the heat causes it to slide with difficulty on the parts.

At 525 degrees C. the smoke is thicker, and the wood slides easily.

At 550 degrees C. the wood gives out small sparks when it touches the metal, very thick smoke issues, but no flame is seen.

At 575 degrees C. the same phenomena take place as at 550 degrees C., but with much greater intensity and still without flame.

At 600 degrees C. the wood takes fire.

Above 525 degrees C. if the parts are placed in the dark they can be seen to be reaching a red heat.

When the desired temperature is reached the parts are left to cool freely in the atmosphere, without any air current striking them.

Third Class—Twenty-two to Thirty Per Cent. Nickel Steels.

These metals are entirely different from those previously considered; the type of the class is the 25 per cent. metal, and what will be said concerning it applies within all practical limits to all the steels between 22 and 30 per cent.

Nickel steel 25 per cent. This cannot be classed properly as a steel, but it can be more correctly considered as an alloy, and from this it will be readily understood that it will not follow the ordinary laws which rule the behavior of steel in its various states.

It is very difficult to oxidize, is very ductile and malleable; it can be heated, hammered, forged, transformed in bars or tubes, drawn and in general manner handled in all sorts of ways without the least difficulty. It softens by tempering, and, whatever may be the cause, this treatment has for effect to reduce the tensile strength and to increase the elongation. Whatever its state may be, natural or tempered, it possesses a fibrous texture and is consequently deprived of fragility. These metals are compressed by hammering, and consequently their tensile strength and their elastic limit is raised by the forging process, while the metal becomes harder, without losing its other qualities. In this manner it is possible to alter the characteristics of the metal according to the requirements. Heating and annealing, or even tempering, however, destroy the changes thus obtained, and the metal becomes still softer than before.

Nickel steel of 25 per cent. resists perfectly all the usual chemical agents of deterioration. Cold or hot water, fresh or salt, acids, or the generality of chemical agents are practically without effect upon it. This resistance has been tested and found to be from 15 to 20 times greater than that of the best carbon steels. Lastly, it is not magnetic at the ordinary temperatures.

As well as the other nickel steels, the 25 per cent. can exist in different states of hardness, according to the percentage of carbon, the general properties being the same. It is remarkable, however, that, while the softest grade (60 kilos t. s.) can be worked cold like ordinary steel, the hard grade (80 kilos t. s.) cannot be cut with the usual tools; special tools are required and the cutting speed must be considerably reduced. It follows that the practical grade is the softest, although in some special cases the harder grade is preferred.

Following are the characteristics of 25 per cent. nickel steel:

	60 Kilos Steel.			80 Kilos Steel.		
Treatment.	E. L.	T. S.	Elong.	E. L.	T. S.	Elong.
Annealed at 900° C.	22	60	25 p.c.	35	80	45 p.c.
Tempered at 900° C.	20	58	40 p.c.	32	77	55 p.c.

The special character of these steels causes them to be put to many different uses. Their great malleability and their property of being unaffected by tempering has sometimes caused their use for boiler plates and tubes, and in general for parts submitted to intense heat, and which must be forged or drawn specially hard. In thin sheets they can be made into very fine and complicated stampings which keep their polish for a practically unlimited time.

Where their resistance to chemical agents is a useful quality they are often used; for instance, in the chemical industry. Electricians often avail themselves of their anti-magnetic properties. Lastly, the harder grade is often used for armor plate.

(To be continued.)

King Leopold of Belgium is having the projected automobile road along the whole Belgian coast finished at his own expense, as he has drawn on his privy purse to the extent of 10,000,000 francs for this purpose. A part of the magnificent way near Ostende has been completed.

A FEW COMMENTS ON THE GRAND PRIX

By GEORGES DUPUY.

THE big motor race that was run on the ideal La Sarthe circuit has been one of surprises. By no means has the tremendously long and trashing speed trial been fruitful in teachings for the automobile trade, except possibly on the old tire question, which was partly solved—in the way of a trick—and except as far as racing is concerned.

Were man and machine that won indisputably the best? Here is a very hard and delicate question to answer. What was

FRANCOIS SZISZ, THE GRAND PRIX WINNER.

needed in that long and strenuous race, where competitors had to face a most dangerous enemy—the hot weather—generally hostile to distance and speed, was, first, a perfectly balanced motor fitted with quick, abundant and reliable lubricating and cooling systems; second, a power adequate to the weight of the chassis and the configuration of the course; third, a frame long, rigid, and low enough to resist the elements, support the propulsion of its engine, and keep the momentum on the level parts of the ground, when the gas was fully admitted. Lastly, a car with as few salient parts as possible, and the total weight intelligently distributed at front and rear.

To my views, eight machines at least out of the number that took the start seemed to realize such a desiderata. They were the Clement, the Hotchkiss, the Renault, the Darracq, the Gobron, the Fiat, the Brasier and the Panhard. Without any desire or absolute authority to criticise the work of the other competitors, I permit myself to say that several racers—many of them being the same type, without the slightest change—sent for one or two years previous, on the Ardennes or Circuit d'Auvergne—were not in shape for the last event. Too much weight, too high suspensions, too short chassis (wheels also a trifle too small), exaggerated horsepower, imperfect working of inlet and exhaust valves, imperfect bearings, imperfect cooling, etc., are the faults found out now that the big race is over. But it goes without saying that these unforeseen mistakes on a racing engine do not affect at all the quality and value of stock cars sold by those firms.

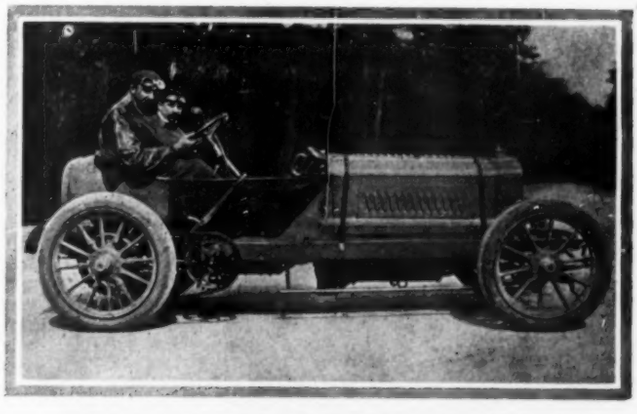
To come back to my former theory as to whether the honors went to the best man driving the best machine, and what teachings were imbibed by the world's automobile industry in the Grand Prix of France, I will say, simply and bluntly, that it was above all "a tire race," and that the Renault rushed first on the finish mostly because it could avoid the customary losses of time on account of its being fitted with an ingenious system of detachable rims. These rims could be replaced in four minutes by one man, when other drivers and mechanicians, nervous and exhausted at the end of the first and second day, employed sometimes twenty minutes to perform the operation. It is about the only lesson taught and only on the freak part of the game.

The disadvantages, on the other hand, were numerous. In the first place, the management of the race was not what was expected; the course was not sufficiently guarded, the stands poorly constructed, badly placed, and badly protected against the intolerable sun. Second, the fact that the race extended over two days proved far more wearisome to spectators and drivers than anticipated. Finally, according to my previous argument, favorites of the first order have been relegated to a distant background.

From the start, the energetic and excellent driver Szisz looked like the winner. His splendidly built little machine was running with great regularity. He drove with nerve that won the admiration of all. His "turns" were particularly remarkable. When he overtook Lancia first, on the raised plank way of St. Calais, where the Italian had just had a puncture, and was already slowing down, the encounter was emotional in the extreme for those who saw it. Lancia would still go at more than 60 miles, and Szisz "rounded" him so closely and fast that the big champion uttered an admirative exclamation.

His arrival on the second day was thrilling. When he left the supply station in front of the grandstand for the last round, everyone knew that unless overtaken by misfortune he must win. He was looked for with intense eagerness, and when at last he appeared above the summit of La Belle Inutile hill, in the distance, a tremendous roar burst from the assembled thousands.

All the drivers proved themselves to be made of the right metal, in spite of their eyes, which were rendered red and bleeding by the powdered tar which was swept up in their rush along the road. Edmond, driving the Renault No. 2, is nearly blind from this cause. Baras, an old companion of the writer in the motor-cycle days of France, was a victim of his tires and of the atrocious tar-dust. He had been too long years "off the ring," and was not probably quite fit for the quick operation of changing tires; his eyes were also badly affected by the particles of tar,



BARAS, ON HIS 112-HORSEPOWER BRASIER, FASTEST LAP.

"Dare-Devil" Baras negotiated the first lap of the Grand Prix course in 52:35, at the rate of 74 miles per hour.

and he had to stop at each turn to bathe them, on the second day. Baras is still considered in France as an extraordinary dare-devil and one of the most adroit and fast drivers. The three Brasiers, otherwise, proved to be high-class racers, extremely fast, supple, and regular.

The failure of the Darracq machines to make any show whatever in the contest is rather a puzzle to me. When Hemery and

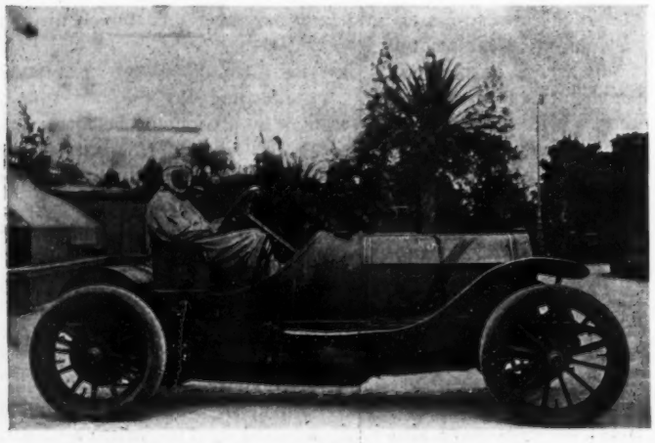
Wagner rushed off on the morning of the 26th I am sure there was not a driver but regarded them as his most deadly enemies. I am afraid the Darracq engineers made a big mistake in putting 180x150 mm. motors (125-horsepower) on the same light type of chassis that won the Vanderbilt Cup last year. Perhaps, also, the low tension magneto newly adopted by the firm did not give every result anticipated. Perhaps, also, . . . but the race is the perfect image of the war where the strongest do not always win.

The Lorraine Dietrich, Fiat and the Itala were the heaviest and more powered cars entered. Each had at least two excellent men —Duray, Gabriel, for Dietrich; Lancia, Nazzaro, for Fiat; Cagno, Fabry, for Itala; and all had good thirds. Fiat ran an honorable race, while the two others failed entirely.

I was not surprised at the success of the Clement-Bayard, knowing what precise cars had been given to the "mise au point" of their new racers. The Clement motor is a marvel of regularity and its lubricating is simply perfect. On the other hand, the "little Benjamin" of the motor game did not deceive anybody in the way he drove his own car.

The four-cylinder, eight-piston Gobron-Brillie, driven by Rigolly, is a great machine, but the chances of the firm were rated few with only one car.

The great old Panhard people are not decidedly with the gods of racing. If they lead on the market, they only follow in the race. But what of that?



CHEVALIER FLORIO ON HIS MERCEDES RACER.

I feel very sorry about poor Teste, who met with a bad accident just after leaving the Vibraye Forest. Nobody knows how he managed, but suddenly, on the long brown road, spectators saw his car turn like a top and rebound on the road. Teste had his left thigh broken, ribs smashed, and both his wrists badly injured. His condition is reported to be serious.

Elliott F. Shepard, driving the only Hotchkiss car left in the race, also turned his machine over, the second day, but no harm was done.

"The elegant Mercedes are really too 'grandes dames' to commit themselves any more in racing," says the *Figaro;* but I will not add, irreverently, with our Paris confrère, that they are only good to carry papers. (This is an illusion to the clever service organized once more by James Gordon Bennett between Paris and Deauville on the sea, for the rapid transportation of his European publications.)

Let us hope that next year's Grand Prix, having given the competitors a better chance to show their qualities, will show us better results; above all, let the organizers only cut the pear in two, that is to say, run the race on half its actual distance, and also revise a few of their rules.

According to the report of the Comptroller General of Patents, English patents relating to improvements in motorcycles have dropped off considerably since 1904 and automobile patents have not increased in number.

MOTORCYCLES AND THE JERSEY LAW.

There are several clauses in the new motor vehicle law of the state of New Jersey which went into effect on July 1, that apply specifically to motorcycles, in addition, of course, to those clauses which cover motorcycles under the general classification of motor vehicles, which means every vehicle propelled by other than muscular power, not running on rails. For the benefit of motorcyclists these clauses are given herewith.

A point on which a question has arisen is whether or not motorcycles are required under the new law to carry license numbers in the rear, or if it is merely necessary for the motorcyclist to possess a license and carry it. The law states that "the owner of each and every *automobile* that shall be driven * * * in this state shall have the number of the registration certificate * * * upon the front and back of every *automobile,*" etc., etc. The italics are ours. Now the term automobile means, in the new law, "all motor vehicles except motorcycles." It therefore would appear that motorcycles are exempt from the order to display numbers.

This question was brought to the attention of Robert H. McCarter, Attorney General of New Jersey, who decided that the law, as it stands, does not require a motorcyclist to attach a license number to his machine provided he possesses a proper license.

The motorcycle clauses are as follows:

(2) Every motorcycle shall carry, during the period from one hour after sunset to one hour before sunrise, and whenever fog renders it impossible to see a long distance, at least one lighted lamp, showing a white light, visible at least two hundred feet in the direction toward which the motorcycle is proceeding.

(5) Motorcycles shall be provided with at least one brake, which may be operated by hand.

(2) Every resident who is the owner of a motorcycle, and every non-resident whose motorcycle shall be driven in this state, shall pay an annual registration fee or license fee of one dollar for such motorcycle, which shall include the right of such person to drive such motorcycle within this state without an examination of his ability to run a motorcycle, unless such an examination be required by the commissioner of motor vehicles, and such owner shall be given a registration certificate in which shall be designated the proper registration number and such certificate shall be valid for a term of one year from the date thereof, unless revoked by the commissioner of motor vehicles, or as otherwise provided by this act.

AUTOS AS EVANGELICAL AGENTS.

ANDERSON, IND., July 2.—Automobiles and religion are to be closely allied in Indiana in the future if the plans of a number of religious sects are to be taken as a keynote. One of the sects that is planning to adopt the automobile as a means of transportation in spreading its belief to the world, is the peculiar band known as the "Flying Rollers," with headquarters at Benton Harbor, Mich. M. S. Tyler, of that city, a representative of the strange band, has purchased a Lambert automobile from the Buckeye Manufacturing Company, of this city, and has left an order for another one, to be delivered as soon as possible. Heretofore the "Flying Rollers" have covered the country on bicycles, but they have become convinced that the automobile will be far more practical and convenient. Members of the band will be taught to operate and care for the cars and meetings will be held in them on street corners. The sect believes in wearing long hair and flowing robes and their appearance clad in the garb of the ancients in up-to-date automobiles will be picturesque, to say the least.

Benjamin Lukens, a retired farmer of this city, is also planning an extensive tour with what he terms a "reformed evoluted preacher." For the tour Lukens, who is of a mechanical turn of mind, has built a two-cylinder runabout that he says is different from all other automobiles. Mechanically, it is built along the general lines of runabouts, but the body and finish are something unusual, being finished in a bright yellow, while a hand-carved effigy on the front represents St. John's vision on the Isle of Patmos. There is also a platform on the front upon which Lukens's dog rides under the shelter of a parasol. Last season Lukens and his friend toured 5,000 miles in a home-made automobile and this year their tour may exceed 10,000 miles.

INDICATING AN AUTO MOTOR AT 1,000 R.P.M.

By H. F. DONALDSON.

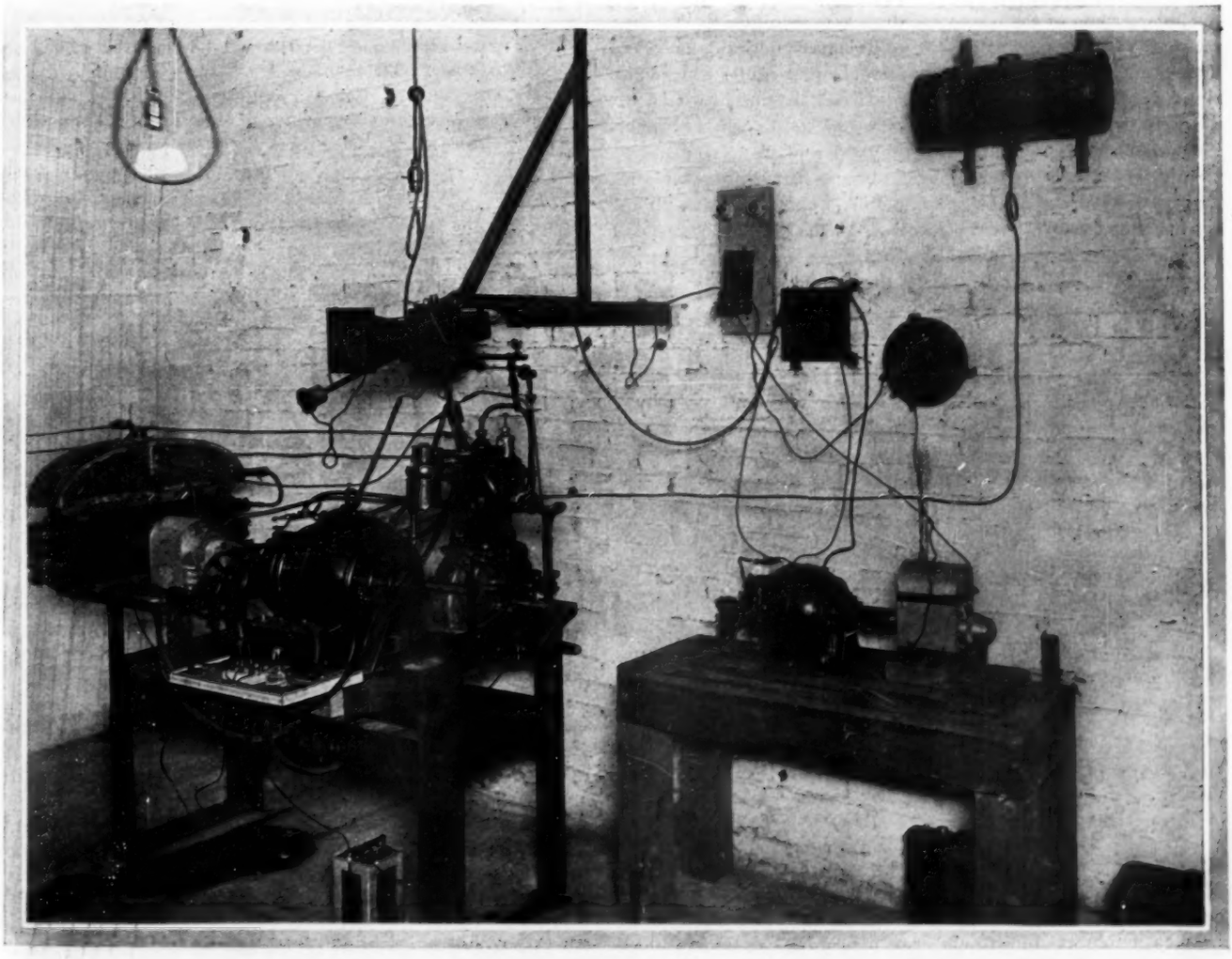
In the purchase and sale of automobiles it is probably true that the question of horsepower is more often raised than any other having reference to the capacity of a machine. In fact, popularly, it is commonly used as the principal measure of value of an automobile. The rating usually employed or assumed to be employed is the horsepower delivered by the motor to the transmission mechanism; or, in other words, at the clutch. This is known commercially as brake horsepower.

Between the clutch and the rims of the driving wheels there are certain unavoidable losses, due chiefly to friction, which in the best constructions are a minimum, but which poor design and bad construction may increase to a serious extent. And just as there are losses in the transmission mechanism between the motor and the road wheels, so there are other losses between the total of energy admitted to the cylinder in the form of fuel and the power output of the motor, and, as in the case of transmission losses, some of these energy losses are unavoidable, some are inexcusable, and some are intentional.

The unavoidable losses include those occasioned by what is commonly termed "cooling," and by the high temperature of the exhaust gases. Inexcusable losses are those due to faulty motor construction, such as badly fitted pistons and valves. Intentional losses occur, for instance, when the spark is retarded to the extreme, in which case much energy is lost in the unburned gases which pass out through the exhaust. There is therefore manifestly a difference between the brake or rated horsepower of a motor and the power computed from an examination of what takes place inside the cylinder of the same motor—technically known as indicated horsepower. The latter is greater than the former.

There are several more or less familiar ways employed by automobile builders to ascertain the brake horsepower of an explosion motor. The most usual is by the use of a friction or "Prony" brake, applied to the flywheel of the motor with suitable apparatus for measuring the braking effort; and by a simple formula the horsepower is worked out. The method in detail is aside from this discussion; it is sufficient to note that the result is quite satisfactory for commercial purposes, as it establishes accurately the effective horsepower of the motor. From the viewpoint of the designing engineer, however, the test is very incomplete; it demonstrates to him little more than the general mechanical efficiency of the motor. It gives about the same measure of general condition that a performance by an athlete gives of his physical well-being; but is just as little a guide as to the correct functioning of individual organs.

The history of what goes on *inside* the cylinder is vitally important if there is to be a departure from "cut and dry" methods. In the case of the steam engine and of the relatively slow



"MANOGRAPH" IN POSITION FOR INDICATING EXPLOSION MOTOR IN ENGINEERING LABORATORY IN NEW YORK.

moving stationary gas engine this history is recorded graphically by the use of an instrument known as an indicator—hence the term "indicated horsepower." With high speed automobile engines, however, the use of the ordinary indicator is impossible owing to the distortion of the diagram which the inertia of the moving parts of the instrument occasions.

This difficulty has now been gotten around by the use of special instruments made abroad which give a photographic record of the work of the motor to which they are attached. One of the most modern forms of instrument, called the "manograph," has been imported by Joseph Tracy for use in tests and research work in New York, and the writer recently had an opportunity to examine it in operation. The instrument is exceedingly ingenious and yet simple in construction, and functions perfectly. In principle it recalls the mirror galvanometer used in the earlier days of submarine cable operation except that the mirror in the manograph is actuated solely by mechanical means.

The illustration on page 9 shows the instrument in the engineering laboratory, in position, attached to a De Dion motor which is now used in connection with tests of ignition apparatus and radiators. It consists essentially of a funnel-shaped box, of square section, closed at the small end and fitted with a ground-glass slide interchangeable with a photographic plate holder at the larger, front, end. In the installation here described the body of the instrument is carried by rigid angle-iron wall brackets over the motor. From the right side of the box an arm extends horizontally carrying a slender shaft with bevel gears at both ends. The outward gear meshes into a gear on a vertical shaft, which in turn is geared to an extension of the camshaft of the engine. This is a 2-to-1 reversed so that the shaft of the instrument turns at the same speed as the crankshaft.

The inner end of the horizontal shaft is geared to a short vertical shaft which has a small crank on its upper end inside the box. This crank imparts a reciprocating motion to a cradle which carries a small vertical mirror, the motion rocking the mirror about its vertical axis. A ray of light reflected by the mirror would thus make a horizontal line, were the motion of the mirror a simple one, and this in its length would bear a certain proportion to the length of stroke of the motor. But the motion of the mirror is a compound one, as will be seen. From the top of the combustion chamber a tube of about 1-32-inch bore, fitted with a water jacket, leads up to a diaphragm on the under side of the body of the instrument, a pin connection passing up inside the body and imparting motion to the mirror about its horizontal axis, the mirror being held normally in a neutral position by delicately adjusted flat springs. Were the engine placed on, say, bottom center and a charge of gas exploded in the cylinder, while the cock in this tube connecting with the diaphragm was open, the mirror would reflect a ray of light in a vertical line which in its length would bear a certain relation to the pressures developed in the cylinder.

Now it can be readily seen that when the engine is turning over, under its own impulses, the compound motion of the mirror will reflect a ray of light that will follow the travel of the piston in the one direction and the varying internal pressures in the other. This being so, all that remains is to secure a controllable source of light for reflection and a means of temporarily reading or permanently recording the path of the symmetrical ray.

The source of light adopted is a miniature Nernst electric lamp, which can be seen in the photograph as an enlargement of the tube extending outward and downward from the front of the instrument. The inner end of this tube is fitted with a small lens for focusing the light on the mirror. The mirror in turn projects the ray in a bright pinhead of light upon the ground glass previously referred to, so that when the instrument is in use the diagram appears in a luminous outline upon the ground glass, the image being upside down as in the focussing glass of a camera; or by the use of a suitable lens the ray can be projected upon a screen set up in front of the instrument, so as to give a large diagram easily observed by a number of persons at one time. When a permanent record of a diagram is needed, a photographic plate-holder is substituted for the ground glass and an exposure made in the usual way to obtain a negative.

As an example of what the instrument is capable of recording, the accompanying diagrams are reproduced. To make the actual diagrams taken more easily read, a typical diagram in which the outline is exaggerated is shown in Fig. I. In this diagram the line *J J* is the atmospheric line, or the line above which all lines (distances) represent pressures in excess of that of the atmosphere and below which all lines represent pressures less than atmospheric. This line is omitted from the actual diagrams for the sake of clearness in reading them. Fig. I is lettered to correspond

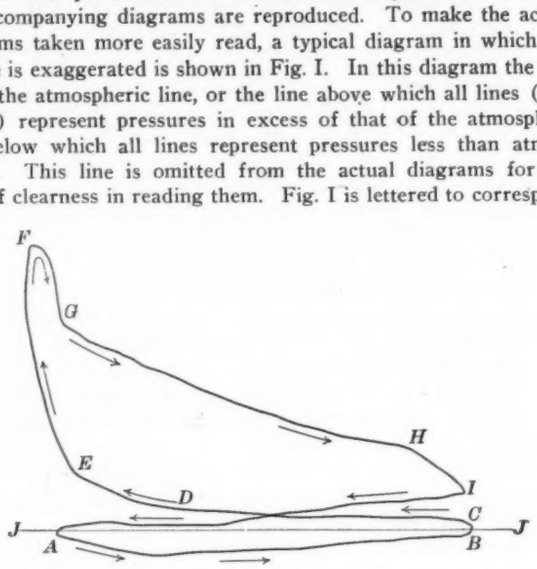


FIG. I.

Indicator diagram of four-cycle motor, with exaggerated outline, showing clearly what takes place in the cylinder at every point in the cycle.

with the actual diagram, Fig. II, so that it can be referred to for a clear understanding of the graphic record of the complete cycle.

The motor from which the diagrams were taken is a single-cylinder water-cooled De Dion with automatic inlet valve, rated at 3½ horsepower. The cylinder is 3 1-8-inch bore and 3 5-32-inch stroke. The diagram, Fig. II, was taken when the engine was turning 1,000 revolutions per minute, full throttle and spark in normal running postion. It represents a complete cycle of operations, which, of course, occurs every two revolutions in a four-

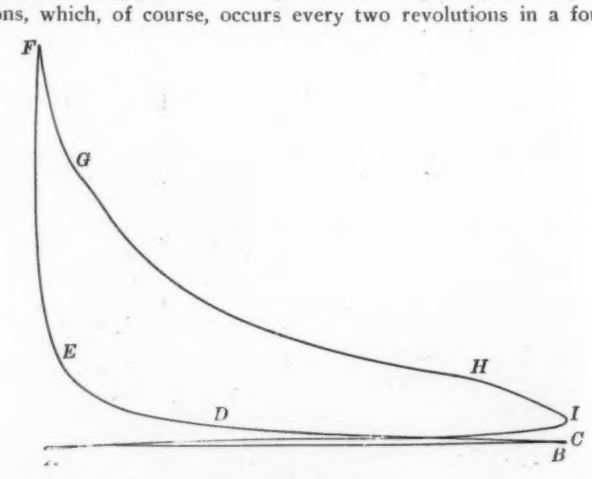


FIG. II.

Diagram at 1,000 R. P. M.

cycle motor. Following the cycle from the beginnng of the suction stroke, the lower line *A B* represents the period of admission. Compression starts at *C* and is continued through *D* to *E*; the comparatively sudden rise in pressure from *D* to *E* is caused by the near approach of the piston to the combustion chamber. At *C* the pressure is atmospheric, and at *E* it has risen to about 70 pounds. At *E* the charge is fired a little ahead of center—as the spark is in the "advanced" position—and the pressure rises abruptly in an almost vertical line to the maximum at *F*, which is about 280 pounds per square inch. At *F* the piston begins the working stroke, the pressure falling rapidly to *G*, showing the immediate loss of heat to the water jacket, accompanied by a corre-

sponding loss of pressure. From *G* to *H* is the expansion curve, showing the steady drop in pressure as the heat liberated from the gas by combustion is converted into work on the piston. At *H* the exhaust valve begins to open, before the piston has completed the working stroke, the resultant drop in pressure being very clearly indicated on the diagram. The pressure at the time of opening is about 38 pounds per square inch. From *I* to *A* the upper line shows the back-pressure during the exhaust stroke at the end of which (*A*) the suction stroke commences again as already outlined.

Fig. III is a diagram made with the spark retarded, the motor running at 750 revolutions per minute. Following the cycle, as in the case of Fig. II, there is no apparent difference until the point of maximum compression *E* is reached. As ignition does not take place here, the line, instead of continuing upwards as in Fig. II, falls upon the compression line as the piston moves downward until at *K* ignition occurs. It will be noted, however, that the rise in pressure is not abrupt, as in Fig. II, but is very gradual, owing chiefly to the greater velocity of the piston as it approaches the middle of the stroke. In Fig. II the piston is practically stationary when the charge is ignited. The maximum pressure is

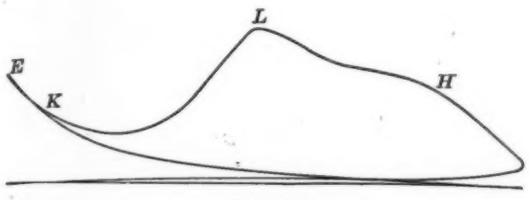


FIG. III.

Diagram with spark retarded, 750 R. P. M.

also much lower than in Fig. II because the charge had lost much of the pressure caused by compression before ignition. From *L* to *H*, where the exhaust valve opens (as in the preceding diagrams), expansion takes place, the curve being uniformly higher above the atmospheric line than the corresponding part of the curve in Fig. II. The reason for this is that on account of the retarded ignition the charge continues to burn much later in the working stroke than when ignition takes place early, as in Fig. II. From *H* the diagram shows the completion of the cycle as in Fig. II.

Besides permitting an analysis of the cycle, the diagram provides an accurate means of measuring the mean pressure on the piston during the working stroke, either by ordinates or by the use of a planimeter, as in the case of a steam engine diagram. The indicated horsepower is the product of the mean pressure *P*, by the area of the piston in square inches *A*, by the number of explosions per minute *N*, by the stroke of the piston in feet *S*, divided by the constant 33,000. This is expressed in the usual horsepower formulæ thus:

$$\frac{P \times A \times N \times S}{33000} = \text{Indicated horsepower.}$$

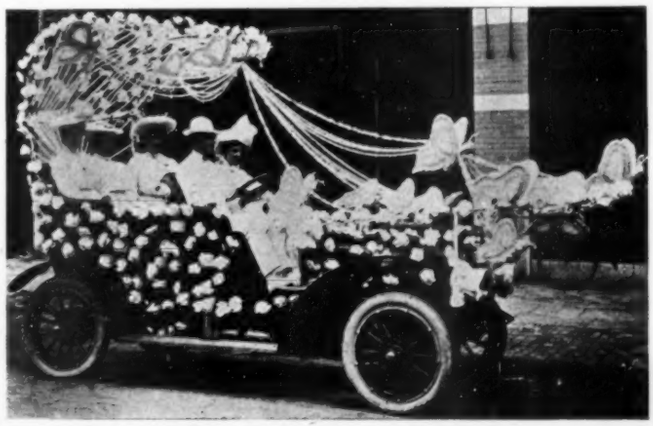
In the manograph diagram each vertical distance of 3 milimeters corresponds to a pressure of I kilo per square centimeter.

Engineers will readily recognize the possibilities of an apparatus which gives a diagram at any speed (r. p. m.) at which an automobile motor is capable of turning. Even were it possible, however, to secure a diagram by the ordinary form of indicator, the manograph would still have one point of superiority that would make it indispensable, and that is the possibility of changing the form of the diagram while it is constantly visible on a plane surface. The ordinary indicator diagram, penciled as it is on a rotating drum, cannot be satisfactorily read while the instrument is in motion. With this apparatus the most minute changes following on spark and throttle manipulation can be studied under all conditions of load. The operator knows before he records a diagram photographically just what the diagram is going to be and has not to wait until the diagram has been made before getting the needed information. The manograph can be operated continuously, all day if need be, and its use opens up an unlimited field of research.

The photograph on page 9 shows the plant in the testing laboratory here referred to. On the left of the picture the De Dion motor direct-connected to a 2-kilowatt dynamo is carried at a convenient height on an angle-iron stand, at the further end of which is a large coil pipe radiator. The dynamo is connected to a bank of twenty-three lamps wired in groups so that the resistance—really the load on the motor—can be varied by cutting out lamps when the motor is running. The small bench to the right supports an electric motor driving a Remy magneto which supplies alternating current to the Nernst lamp in the outer end of the objective tube that furnishes the source of light for the instrument. The electric motor takes current from the lighting system of the laboratory. On the wall above is a gasoline tank containing the fuel for the automobile motor. As previously referred to, the manograph is carried on a bracket above the De Dion motor so that it is not affected by the vibration set up by that motor. When the photograph was made, a magneto was in place on the frame and geared to an extension of the dynamo shaft, the current being used to energize the jump-spark ignition coil carried on the little shelf in front. A duplicate ignition set consisting of storage battery (seen on the floor beneath the motor) and induction coil (not in view) is provided for the purpose of securing comparative readings. The knife-blade switch on the shelf is wired so as to connect with either the magneto or the battery ignition set, by throwing it to one side or the other. In the photograph the connections seem rather complicated, but they are really simple, though numerous, owing to the number of different pieces of apparatus employed.

A SHORT CUT TO LONG ISLAND.

Automobilists from points north and northeast of New York City desiring to go to Long Island are now compelled to drive through a considerable section of New York City before reaching a ferry that will take them across to Long Island. With a view to making the trip shorter and pleasanter, cutting out the long and often decidedly unpleasant run through congested city streets, a ferry from New Rochelle to Sand Point Light has been planned by Willis P. Jones, of Mount Vernon, N. Y., who has already secured a franchise and is working on his plans. The proposed ferry will carry twenty or more care at once, and will make the three-mile trip in about twenty minutes, making a trip each hour. Mr. Jones also plans to open a high-class restaurant at Sand Point, where he has acquired a plot 375 feet deep with the width of 100 feet facing on the Sound.



PRIZE-WINNING RAMBLER IN RECENT BUFFALO PARADE.

Albert Poppenberg and party in car. Prize was a silver loving cup, given by the Automobile Club of Buffalo, under whose auspices the parade was held.

A GARAGE PROBLEM SOLUTION.

By A SMALL CAR OWNER.

Nine motorists out of every ten who live in New York City, if asked to name the greatest problem that exists in connection with automobiling, will make answer, "The garage problem."

Not that any blame attaches to the garage keeper—for him, with rent, insurance, etc., the problem is as great as for anyone else—but, in a city where land values over a few square miles aggregate taxable billions, it is only natural to find that such a problem exists.

One great objection to the garage is that more often than not it is inconveniently located. The automobile as a regular, every-day means of going to and from work loses much of its convenience when you are confronted with the alternative of going from a quarter to half a mile for it and of waiting ten or fifteen minutes while it is wheeled from behind thirty other cars and brought by an elevator down to the street, or of waiting—and paying for—some garage attendant to get good and ready to deliver it to your door.

How a New York City automobilist with a $400, $500, $650, or $750 car, and a desire to keep down expenses by doing his own driving, repairs, etc., might go about it to secure the essentials of inexpensive operation and up-keep would suggest many baffling questions. The solution exists, nevertheless—having been applied by a few—and it will stand application by many others.

The formula is simple. In New York, even surprisingly close to the center of the city, there are numerous roadhouses that cater to the Sunday and weey-day crowds that seek their amusement in the way of good dinners, and beverages mild and otherwise, consumed in "palm gardens," "beer gardens," "casinos," and similar seductively-named resorts. Practically all of these resorts maintain wagon sheds, by way of catering to their patrons who travel for the time being in a much-washed and correspondingly resplendent livery rig, and to the increasing number who use the "locomotive of the highroad."

Invariably the privileges and emoluments of these wagon sheds are in charge of an enterprising individual, often a gentleman of color, to whom a ten-cent tip looks as large as does a dollar bill to the man at the garage. You will surprise yourself by finding how easily the "shed man," with the full consent of his employer, will succumb to the temptation of $5 a month, offered for the mere privilege of running your car under the shed, to be left there when not in use. The details of the arrangement will vary slightly at different road houses, but the general proposition will invariably go through.

Diplomacy will suggest occasional patronage of table or bar maintained by the proprietor of the concern, and it may even be much to your purpose to devote a little time once in a few months to giving the "boss" a real automobile ride, at least "around the block." In the winter months, when the sheds are deserted, very possibly you will be able to secure the inevitable enclosed portion at the end, as a more thorough protection to the car, though, of course, you will have to use anti-freezing solution and take other necessary precautions against the disastrous effects of cold. The shedman's assistants you will find consider that ten cents and the experience are ample reward for hours spent in handling the greasy and begriming end of a repair job, which you, in your superior wisdom (?), of course will direct. And for from 10 to 25 cents you can depend upon securing a first-class job of carriage washing—after you have found out and duly imparted your information as to the proper kind of soap to use (the same service costs from 50 to 81 cents at the garage). Buy a 25-cent can of metal polish, and you will find that it will keep the brasses as bright as it does in the hands of the professional chauffeur.

Closely related to the problem of taking care of your car at the home end of the line is the problem of what to do with it at the office; but the answer to this is absurdly easy: Leave it at the curbstone. There is no law or ordinance in New York that denies the use of the public street to the occupant of any property fronting upon it, should he desire to leave there, for an indefinite time, a conveyance belonging to him. If you pay rent in an office building, you are thereby an occupant of the building, and, as such, entitled to leave your car—"close to the right-hand curb" as the law specifically provides—for as long as you like. Simply remove any easily stealable accessories, keep the lamps lit at night, while standing as well as while running, and leave things so that no meddler can start the engine—some simple but secret means of disconnecting the ignition circuit is effective.

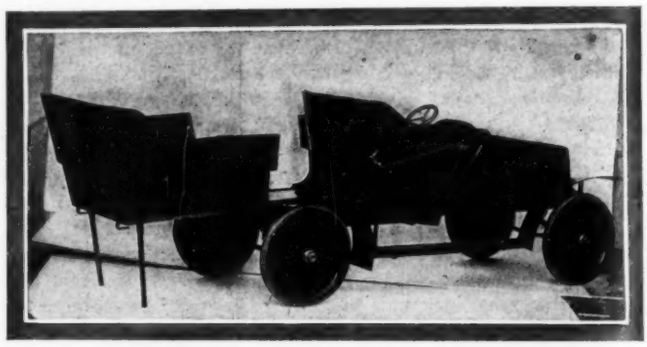
It does not matter whether you are on the Broadway or the Fifth avenue side of the Flatiron Building, or in front of the Syndicate Building in Park Row, nor does it matter how congested the traffic may be. Once your car is placed where you wish to leave it, it is your right to have it stay there; and, if the street becomes blocked, it is the other fellow, not you, who is up against traffic congestion.

Best of all, the plan herewith outlined is not merely a means to economy; it also is insurance against the radiator of your runabout being poked through with a spring horn by the careless manipulation of someone else's Mercedes, and against the quantity of spare parts, tools, etc., that you acquire by buying, borrowing, and other means, both fair and foul, going to swell similar accumulations that other people acquire by similar means.

The substantial practicability of the foregoing can be vouched for by the writer, who will be pleased to hear from anyone in a position to adopt, criticise, or elaborate these suggestions.

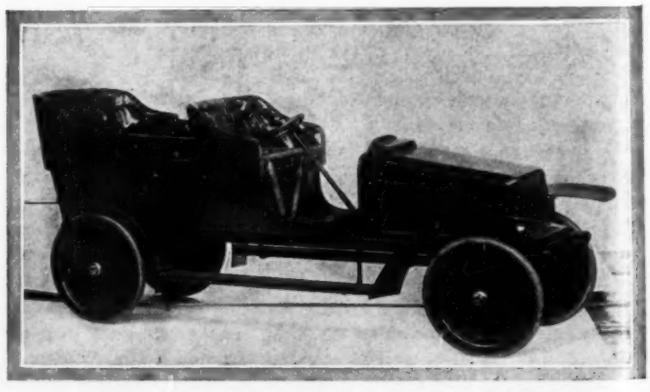
ATTACHES WITHOUT NUTS OR BOLTS.

An automobile with a detachable tonneau that can be removed and replaced without the use of bolts or screws was shown at the English Olympia show, and is the invention of Lieutenant Wyndham, a well-known English automobilist.



DETACHABLE BODY UNFASTENED AND MOVED BACK.

A good idea of the general construction of the detachable tonneau is afforded by the two illustrations. By loosening the catches the rear part of the body can be moved back, leaving



BODY IN PLACE FASTENED WITHOUT BOLTS OR SCREWS.

the rear part of the frame clear so that a sloping deck can be applied, converting the machine into a runabout or cross-country car of the now popular type.

FRICTION CLUTCHES AND THEIR FUNCTIONS.—II

IN some band-and-drum clutches the arrangement of the clutch last described, an expanding ring in a cylindrical drum, is reversed, and the band is placed outside and is caused to contract on the outer surface of the drum. A good example of this type of clutch is illustrated in Fig. 1. The driving member of this clutch consists of a bronze drum with integrally cast spokes and

FIG. 1.—EXTERIOR CONTRACTING BAND CLUTCH.

hub and with four forks projecting radially from one edge of the rim. This completes the flywheel member. Four lugs cast on the rear face of the flywheel rim enter between the jaws of the forks, and bolts passing through forks and lugs hold the drum to the flywheel. The lugs do not fill the spaces in the forks, however; on each side of each lug, between the lug and the fork arm, is a stiff helical spring to assist in taking up shocks and give smooth starting.

The band is of steel, split at one point, and is supported by two arms projecting from the hub carried on the forward end of the clutch shaft. One of these arms rigidly holds one end of the split band, while the other end of the band is connected to the short end of a pivoted lever, the opposite end of which is adapted to be moved by a cam on the hub slid back and forth by a collar and fork connection in the usual way.

The contracting band clutch is also made with a band of helical form, wound around the drum. The fundamental principles are the same as in other band clutches, the band merely being lengthened. This form has been used with success on well-known foreign cars.

An Ingenious Self-adjusting Clutch.

An exceedingly ingenious clutch is shown in the rough sketch of a French invention. (Fig. 2.) In a rearward projection of the flywheel *F F* is formed a drum *D D*, the inner periphery of which is ground truly cylindrical. A ring *B B* of cast iron is split at one point; normally this ring is smaller than the inner periphery of the drum, which it does not touch unless caused to expand. Two shoes, *S S*, bear against the inner surface of the ring and serve to expand the ring when they are pressed outward radially. This is accomplished by the arms *a a* pivoted at *t t* and exerting pressure on the shoes *S S* through hardened steel rollers *p p*. The arms *a a* rotate with the clutch shaft *R*, their wide ends resting in slots or keyways *k k k k* in the enlarged end of the shaft *R*. The long ends of arms *a a* are fitted with steel rollers *H H* and may be pressed apart by the cone *C C*, which consists of four segments or wedges, each independently slidable on a sleeve *M*. This sleeve runs loosely on clutch shaft *R*, but is forced to revolve with the flywheel with which it is rigidly connected by the casing *V V* bolted to the flywheel and to a flange on the sleeve, as shown. Four push rods, two of which are shown at *r r*, pass through and are guided by holes drilled through the flange on the sleeve *M*. The push rods are attached to a collar *E*, which is of the usual type, drawn forward by springs *O O* and retracted by a fork and pedal. Cavities are cut in the rear ends of the wedges to take heads formed on the ends of the rods *r r*, the heads fitting very loosely in the cavities. A small spring, not shown, in each cavity tends to keep the end of the push rod clear of the forward end of the cavity.

Now, suppose the clutch pedal is released suddenly—an act that would be followed by unpleasant, if not disastrous, results with a cone clutch. Impelled by springs *O O* acting through the push rods, the cone as a whole is moved forward until two of its segments are stopped by coming in contact with rollers *H H* while the other two segments continue to advance until the small springs that keep the heads of the push rods clear of the ends of the cavities close up. The two segments not in contact with the rollers have now advanced a little further than the other two, and thus form a step which the rollers must mount as the cone revolves. The instant the rollers leave the segments with which they first came in contact, these segments, in their turn, are left free to move forward as far as the little springs in the cavities will permit, and thus another step is formed, a little higher than the last, up which the rollers must again climb. And so the progressive action continues, each little step forcing the arms *a a* and consequently the shoes *S S* further apart and bringing the

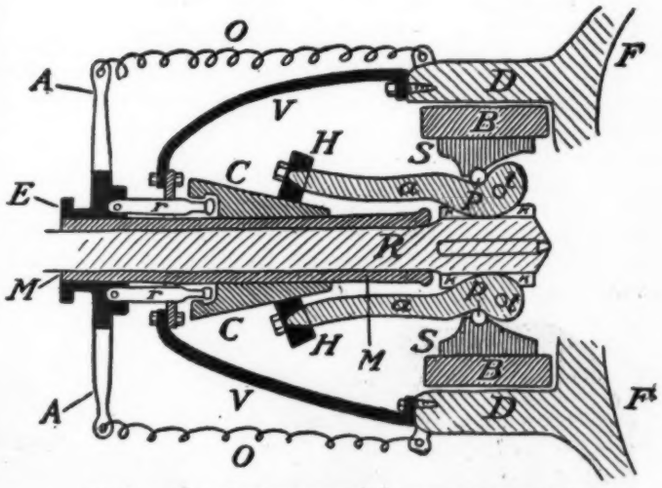


FIG. 2.—AN INGENIOUS FRENCH EXPANDING CLUTCH.

ring *B B* into closer contact with the drum *D D*. The forward movement of the cone segments must continue as long as there is any slipping; when the slipping ceases entirely the cone and the flywheel will, of course, be rotating at exactly the same speed; but should any slip occur, the rollers will find a pair of segments forming a step to tighten the band a little more until the slipping is stopped. The clutch is thus self-adjusting while running, automatically taking care of slipping and of wear.

The Hele Shaw Multiple Disk Clutch.

A type of clutch that has been adopted by a number of automobile manufacturers both here and abroad, and one that gives excellent results, is the Hele Shaw multiple disk clutch. In this clutch and its variations the driving and driven members consist of a series of disks, or, more properly speaking, broad rings of cast iron, steel or bronze or alternating plates of two of these metals. Half the number of plates rotate with the flywheel, constituting the driving member, and the other half rotate with the clutch shaft, constituting the driven member. The plates alternate—first a driving disk, then a driven disk, and so on. The plates are so mounted that when the pedal is pressed and the clutch spring pressure withdrawn, the plates hang loosely and exert no friction upon each other. But when the pedal is released and the spring pressure applied, the plates are forced together and the driving disks grip and carry with them the driven disks. One of the features of this clutch is that it picks up its load with great smoothness. The disks are inclosed in an oil-retaining casing. While the disks are apart oil covers them so that when again brought together they are well lubricated, and slip readily until by the pressure of the spring and centrifugal action the oil is worked out, when the metal-to-metal surfaces take a firm grip and drive without slipping. Thus the advantage of an easy-slipping clutch is combined with that of a positive driver. The rapidity with which the clutch takes hold can be varied considerably by varying the thickness or body of the lubricating oil used, thick oil naturally remaining on the plates longer than thin and causing more slipping.

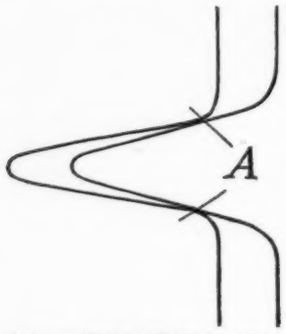


FIG. 3.—HELE SHAW PLATE.

In the Hele Shaw clutch as made by the originator each plate has a single annular corrugation, a cross section of which is shown diagrammatically in Fig. 3. When the plates are pressed together the corrugations nest together, the contact point being at *A*.

Varied Forms of the Disk Clutch.

While the multiple disk clutch is widely used, it is not as frequently seen in its original form, with corrugated disks, as with plain flat or slightly dished disks. The latter form causes the disks—which are springy—to naturally separate when the clutch spring is released, and thus the friction due to drag is eliminated. In some cases half of the disks are faced with leather, the friction surfaces thus being leather against metal. In a clutch of this variety no lubrication is required, the leather slipping at first, but holding well when fully engaged.

An advantage possessed by the multiple disk clutch is that it can be made of small diameter, the frictional area depending upon the number of plates used, and the flywheel can thus be used as a fan by having flat spokes set at the proper angle with the plane of the wheel. The space occupied by the clutch may be so small, diametrically, as to cover only the practically dead central part of the fanwheel. The number of disks used of course varies greatly, running from three to fifty or sixty small disks.

A good idea of the principles involved in the construction of a multiple disk clutch can be obtained from the three illustrations, Figs. 4, 5 and 6, showing such a clutch complete, the driving member and one driving disk, and the driven member and one of the driven disks. In this particular clutch the driving disks are faced with leather. There are altogether nine disks.

A flange on the rear end of the engine shaft carries three studs at equal distances apart on its periphery, the studs projecting rearwardly, parallel to the shaft. On these studs are strung the four driving disks, of steel faced with leather on both sides. The rings are of such diameter that the holes for the studs are close to the outer edges. The whole of this part of the clutch must, of course, revolve with the engine shaft and constitutes the driving member.

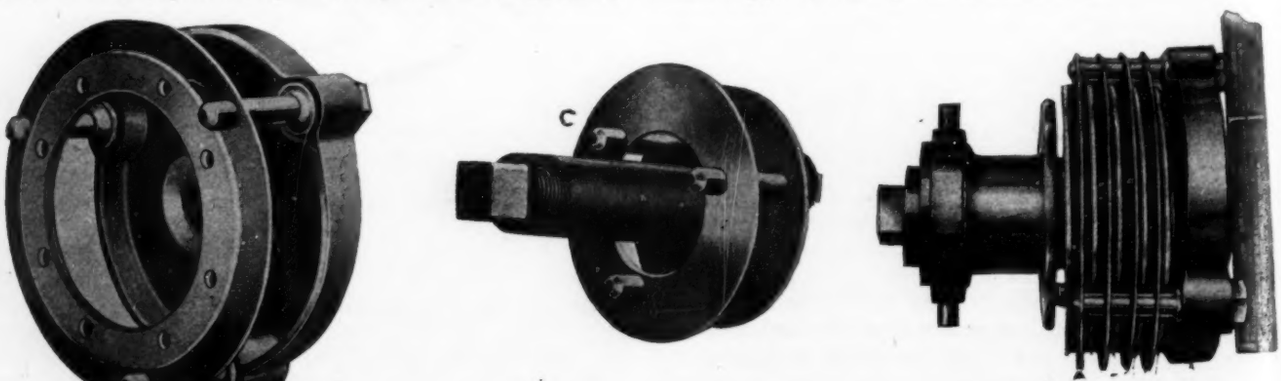
The driven member is made in a very similar way. A flange is carried on the clutch shaft near its forward end. The end of the shaft enters a bushing in the rear end of the engine shaft and the flange is housed in the recessed driving flange, its office being to carry the three studs on which the polished steel driven disks are strung. These studs point in the same direction as the driving studs—backward—but are nearer the center, so that the holes in the driven disks are close to their inner edges.

Instead of being strung on studs, the disks may be notched at their edges and placed in drums with the notches running on feathers or keys on the peripheries of the drums. Or lugs on the disks may engage in slots or keyways in the drums. The principle remains the same in any case.

Disk clutches having a small number of disks—three or five—are of large diameter in order to obtain the requisite frictional area. The principle of operation is the same as with other disk clutches, though the details differ in many cases.

Besides the clutches of the types mentioned there are others not so widely known. A type of clutch that is of very recent origin, so far as the automobile is concerned, is that in which pneumatic or hydraulic pressure is substituted for the pressure of the usual clutch spring. The pneumatic clutch fitted to an American car consists essentially of a very short cylinder of large diameter—the bored-out interior of the flywheel—in which is a heavy leather diaphragm on which the air pressure acts, forcing the frictional surfaces into contact. Owing to the elasticity of the air and the nicety with which it can be controlled, the action of this clutch is exceedingly smooth and easy. A piston pump driven from the engine supplies the requisite pressure.

Hydraulic clutches, in which oil or other liquids are used as agents for the transmission of power, and magnetic clutches, in which the frictional surfaces are drawn together by electromagnetism, have met with considerable success in an experimental way, but are not yet in commercial use.



Driving Member. Driven Member. Complete Clutch.

FIG. 4.—COMPONENT PARTS OF LEATHER-FACED MULTIPLE DISK CLUTCH, AND CLUTCH COMPLETE.

EQUIPMENT SUITABLE FOR TOURING

By HARRY W. PERRY.

LONG distance traveling by automobile, especially through parts of the country not much frequented by motorists, can be made very delightful. provided sufficient forethought is exercised in making preparations before starting. There are many things that add to convenience and comfort when touring, and their presence or absence may represent just the difference between enjoyment and dissatisfaction. A whole tour might be spoiled, for example, by failure to take along sufficient clothing of different kinds for changes suitable to all sorts of weather. After driving or riding for 100 or 150 miles through heat and dust for a day, it is deliciously refreshing to have a bath and make an entire change of clothing before dinner. So, too, if the tourists have encountered rain, dry clothing will be required at the end of the day's run.

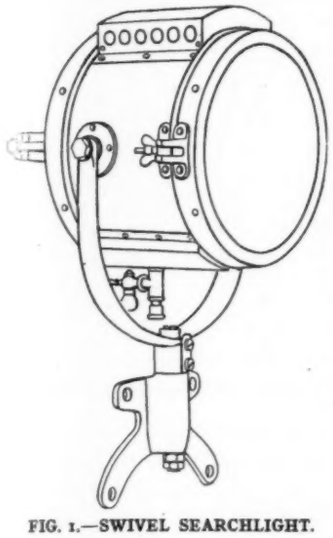


FIG. 1.—SWIVEL SEARCHLIGHT.

Prepare for Emergencies.

Although a trunk often is sent ahead by express to each night's stopping place on the itinerary, troubles on the road may prevent a touring party from reaching the proposed destination of the day's run, or a change of route may seem desirable, or, as not infrequently happens, the express company may not forward the trunk promptly. Moreover, it is very bothersome to be attached to one end of a string whose other end is tied to a trunk. Freedom of action and a mind untroubled by thoughts of the need of arriving at a particular place at any definite time contribute wonderfully to enjoyment when on tour. That which is true of a trunk and its contents applies equally to an extra tire and certain other articles pertaining to the car which there might be no occasion to use on a trip of 1,000 miles and that seem only to occupy space and load down the machine, yet which should be always at hand since they are wanted only in emergencies, and emergencies notoriously occur at the most inopportune times and remotest places.

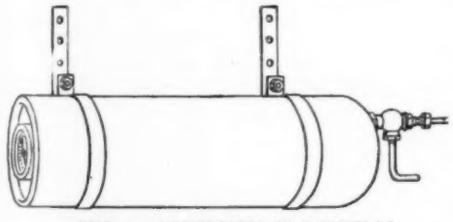


FIG. 2.—ACETYLENE GAS TANK.

Car as Previously Equipped.

For the purposes of this article it will be assumed that the car has the usual equipment for ordinary use in town, supplemented by the specialties illustrated and described in the article "Equipment for a Touring Car," published in THE AUTOMOBILE for June 28. These include two headlights, a pair of oil side lights, a tail lamp, kit of repair tools, extension or Cape cart top, with storm and side curtains, extra tire shoe and inner tubes, tire repair outfit including tire sleeve or rubber band, jack, funnels, oilers, hydrometer, dashboard clock, speedometer and distance register, volt-ammeter and portable electric lamp for making examinations and adjustments at night. Assuming that the car is fitted out with all of these things that the owner may consider essential or desirable for the pleasure of the party when touring, we may consider other articles more especially of use in country driving far from home.

Swivel Searchlight for Night Driving.

If there is to be any night driving—and there is no more delightful experience than driving over good roads through strange country in the cool air of a summer night—a powerful searchlight mounted in the middle of the dash goes a long way toward insuring against accident. A swivel lamp (Fig. 1) can be turned to follow the windings of the road before the car comes to them, and the occupant of the front seat at the side of the operator can manipulate the searchlight. If preferred, a pair of swivel lamps can be mounted on movable brackets at the front of the car in place of the fixed lamps and connected so as to move from side to side as the road steering wheels are turned, mechanism for this purpose being offered in the market. Choice of the two systems lies with the buyer. The interconnected brackets relieve the driver or his companion from the necessity of turning the lamps by hand, and the twin lamps give a good illumination on the road surface directly in front of the car; on the other hand, the single searchlight mounted on the dash has the advantage of being in a more elevated position where it projects its single narrow beam of light a long way in advance and of being independently movable.

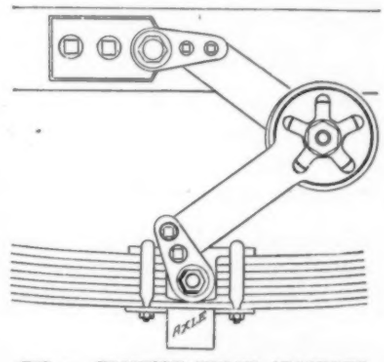


FIG. 3.—FRICTION SHOCK ABSORBER.

Gas Storage Tanks for Lamps.

Either system may be used with an independent acetylene gas generator that can be attached to the side of the car just above the running board. Many prefer instead to attach a tank of gas, which when empty can be exchanged in most cities for similar tanks freshly charged. These tanks (Fig. 2) are made in different sizes, a popular size measuring twenty inches long by six inches in diameter, and contain enough acetylene gas for sixty or more hours' burning. They have

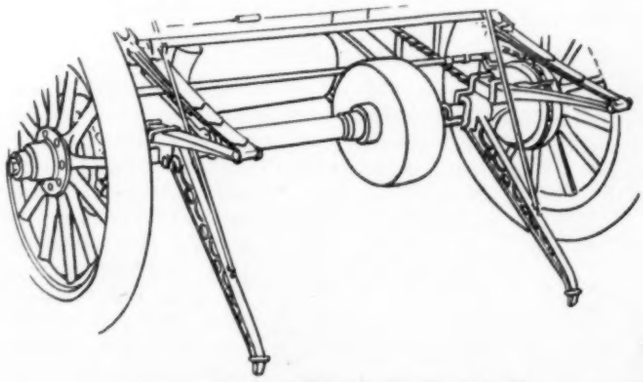


FIG. 4.—SPRAGS ATTACHED TO REAR AXLE.

a gauge at one end for indicating the pressure in the tank, so that the user may know when it is exhausted, and valve and connection at the other end for attaching the small rubber tube leading to the lamp.

Shock Absorbers Smooth the Way.

In swift driving over rough or uneven roads the easy-riding qualities of the car are much increased and the danger of spring breakage is greatly reduced if the car is fitted with a set of shock absorbers. These are now made in a dozen or more different forms involving several principles of operation, as friction, pneumatic and hydraulic. The one illustrated in Fig. 3 belongs to the friction type first brought out and is of a form in common use. The upper arm is bolted to the car frame and the lower one to the spring just above the axle. Friction developed in the "elbow" joint, which can be regulated as to tension, retards the violent action of the spring when the wheels pass over large obstacles or drop into depressions suddenly.

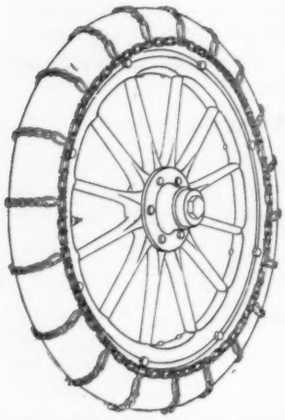


FIG. 5.—TIRE CHAIN ATTACHED.

Glass Screen and Wind Shield.

A device that is almost essential to comfortable touring in all sorts of weather is the glass screen mounted above the dash. This not only shuts out the rain and raw winds in bad weather, closing the front of the car when the extension top is raised and the side curtains buttoned in place, but also protects the passengers from the wind laden with dust in dry weather. There are certain advantages in having a screen that either folds forward or down or has sliding sections that can be lowered so as to give the driver an unobstructed view of the road. This is especially desirable in misty weather, when moisture collects on the glass and obscures the vision. All of the screens are made of heavy plate glass, usually beveled, and set in wood frames, commonly of cherry or mahogany, finished in the natural wood, varnished. The mountings are polished brass or nickelplated steel.

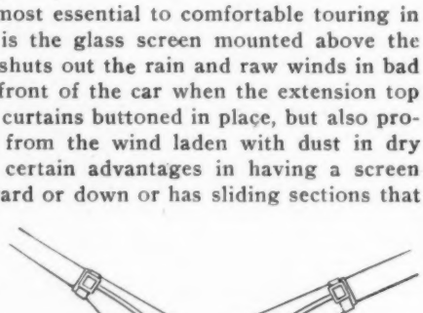


FIG. 6.—STEERING CONNECTION GREASE BAG.

Sprag Increases Safety on Hills.

The brake equipment of all cars has been vastly improved during the last year or two, so that now the better touring cars have efficient service brakes on the transmission and double-acting brakes acting on drums on the rear road wheels of sufficient strength to slide the tires on the ground. Not a few cars have both internal expanding and constriction band brakes acting on the wheels. Nevertheless, to insure safety on hills, where a machine might start to roll backwards because of worn and improperly adjusted brakes, and perhaps plunge over an embankment through erratic steering, the cautious man will see that a sprag is fitted to the machine. Some cars have a pawl and ratchet mechanism built on the transmission or into the wheel brake drums and others have sprags hung from the rear axle or chassis frame and suspended at the free end so that they may be dropped into contact with the ground. There is offered for sale in the sundries market, however, for use on cars not already so provided, a device of the latter sort to be attached in pairs to the rear axle of large touring cars, as in Fig. 4.

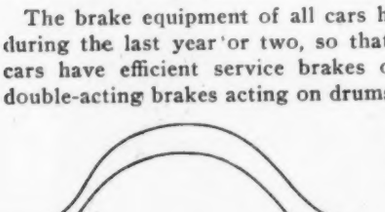


FIG. 7.—RUBBER SPRING BUFFER.

Tire Chains for Slippery Roads.

The simplest expedient to prevent slippage of the wheels on muddy roads, especially when mounting heavy grades where all the traction possible to be secured is needed to make the ascent, is a set of tire chains (Fig. 5). These can be put on and taken off in a short time without much trouble, and when removed can be gathered into a small bunch that is not very heavy (about four pounds apiece) and stowed in the toolbox or other convenient place. Besides preventing slippage in mud, they also make it impossible for a car to skid badly on wet asphalt when in town. Similar purposes are served in another way by means of steel studded leather treads and tire covers vulcanized permanently onto the tire shoes. There are also several other forms of detachable metal anti-skid devices.

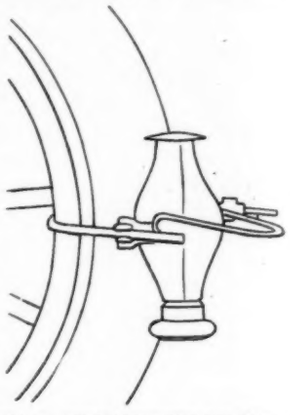


FIG. 8—PORTABLE VULCANIZER.

Protection for the Car.

The experienced tourist displays his acquired wisdom by sparing no trouble beforehand in protecting every part of the mechanism of his car against rain, mud, and damage by other causes. He hangs an apron under the engine if the car has no metal pan there. He sees that there is gauze protection for the carbureter intake and that the opening is placed in such a position that water and mud will not splash onto it and, collecting there, finally obstruct the passage of air. He insures against unhappy delays on the road because of an exhausted battery by carrying along a set of extra cells, or, even better, has a double ignition system on the car, so that if anything should go wrong with the magneto he can switch in the battery and coil. He gives particular attention to the wiring system, using the best and heaviest cable for the high-tension current and wrapping all exposed connections with electricians' tape to prevent short-circuiting in case of heavy rain. He also gives attention to the steering connections, cardan joints and similar bearing parts, which should be protected by means of leather or enameled duck bags (Fig. 6), especially made to be packed with grease and strapped over the joints, excluding dirt and keeping the surfaces lubricated. Lamps can also be protected from rain and dust and kept brightly polished by the use of waterproof covers specially made for the purpose.

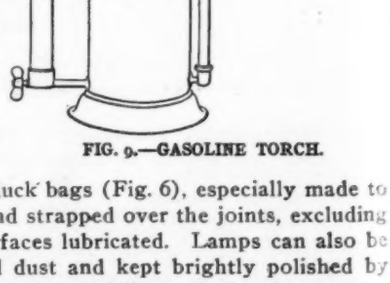


FIG. 9.—GASOLINE TORCH.

"Spares" That Should Be Carried.

In the matter of "spares" for replacements and repairs in case of breakages and mechanical or electrical trouble on the road there is almost no limit. The variety and size of the stock of these is dependent upon many things, such as the length of the tour, the nature of the route and the probable availability of materials at frequent intervals, the thorough-

ness with which the car has been prepared for the journey, the known quality and dependability of the machine in all of its parts, etc. On a long tour it is advisable to have, in addition to a full complement of tools, two or three new piston rings, a set of spark plugs, at least one set of balls for the front and rear wheel bearings if the wheels run on ball bearings, a pair of extra spring clips, an assortment of split pins, washers, nuts, valve keys, a new valve or two and valve spring, copper gaskets, asbestos packing, some insulated wire and ignition cable with detachable terminals, a spool of steel wire, plenty of cotton waste, and similar small articles commonly used on an automobile.

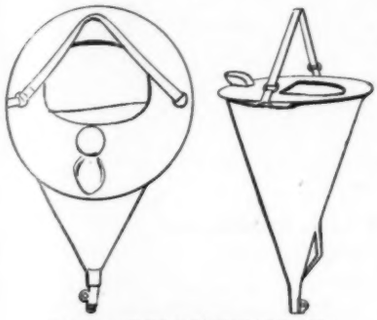


FIG. 10.—COLLAPSIBLE BUCKET.

Rubber Spring Buffer.

In event of the breakage of a spring leaf a rubber spring buffer (Fig. 7) will be found of use, both to prevent breakage of additional leaves and to keep the frame from bumping on the axle. The buffer is a block of solid rubber of the shape shown, with notches to pass over the spring clip and holes through which pass the straps to hold the buffer in position on top of the spring.

Vulcanizing on the Road.

In addition to the regular kit of tire repair tools and a supply of patches of assorted sizes, cement and sandpaper, it is a good plan to carry along an extra valve and means for vulcanizing. If a valve proves too defective to be repaired, the new one can be substituted on the road and vulcanized into place. If means for vulcanizing is carried in the car patches can be more securely attached to inner tubes and cuts in the shoes can be repaired where otherwise the job would have to be intrusted to repairers of doubtful expertness in remote places or the injury allowed to go unremedied until the next city was reached. Practical motorists have found the little vulcanizing device illustrated in Fig. 8 of great utility and convenience for these purposes and very handy to carry in the car. It is made in both cast iron and aluminum, burns gasoline, and the larger sizes will vulcanize a patch eight to ten inches long and the full oval of the tire to within an inch of the rim on both sides. A blow-out can be mended by vulcanizing a fabric patch over the inside of the hole in the casing at the same time that the outside rubber is being vulcanized. Thirty minutes usually suffices for the operation. A thermometer is attached to register the heat and the lamp has a flame regulator to hold the heat at the proper point long enough to complete the job. As a substitute for real vulcanizing, by a method somewhat less tedious, a special kit of self-vulcanizing cement and means for applying it is put up especially for tourists' use. The box contains special cements and acid solution to produce a chemical action resembling heat vulcanizing, making a permanent job that heat or hard usage will not undo. With this preparation a patch can be secured in place in from three to five minutes, after having exposed the tube and properly prepared it by rubbing off the chalk with sandpaper and washing the rubber with gasoline.

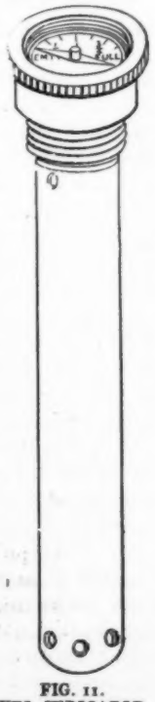


FIG. 11. FUEL INDICATOR.

Torch for Soldering and Brazing.

A plumber's torch is often a very useful article to have at hand to be used when the emergency arises for soldering leaks in tanks, radiator, pipe connections, etc. Although many automobilists will prefer to "take a chance" and depend on wayside tinsmith and general repair shops for such jobs, an owner who has a liking for mechanics and work about his machine will often accomplish a more satisfactory job himself by the roadside and thereby save considerable trouble resulting from such leaks. In Fig. 9 is shown a common style of torch that burns gasoline and has a double jet, one for compressed air and the other for the fuel. Air is compressed in the reservoir above the fuel by means of the small hand pump that also serves for a handle. The tank of the ordinary torch holds about a quart. The flame can be regulated and is sufficiently hot to serve for brazing as well as soldering.

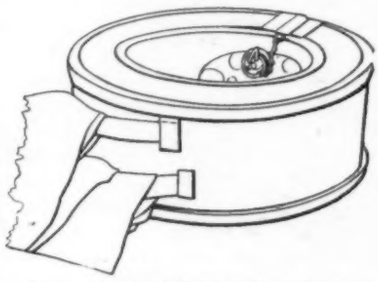


FIG. 12.—COLLAPSIBLE WASH BASIN.

Collapsible Water and Gasoline Bucket.

When touring it frequently becomes necessary to use water in the circulating system that is taken from horse troughs and even ditches and ponds along the roadside. Too often the water is dirty and there is no pail or other receptacle suitable for filling the radiator. It is also sometimes found in small towns that the corner grocery from which gasoline is secured for filling the fuel tank uses the same measure and funnel for handling gasoline as it uses for kerosene, turpentine and, possibly, for molasses. It is not safe to run the risk of sticking up the carbureter passages, fouling the spark plugs and getting poor work out of the engine by allowing unclean measures and funnels to be used. Instead, the car should be provided with a folding pail, which can be used for filling the fuel tank and the radiator. Such buckets are made in several styles, a common form being made in the shape of a wooden water bucket, but collapsing on the principle of an opera hat, two metal hoops at bottom and top being hinged at diametrically opposite points and connected together by hinged upright arms that hold the hoops apart. The sides of the bucket are made of waterproof canvas. Such a bucket has a capacity of twelve quarts. Another form especially adapted for automobile use is shown in Fig. 10. It is conical, made of rubber-covered material and has an automatic valve at the lower end. When the nozzle is lowered into the tank opening a valve ring on the stem catches on the side of the opening and opens the valve. The flow can be regulated with ease. At the top is a strap for holding the bucket, and on one side is a spout with a strainer. The top is partially covered to prevent slopping. When collapsed this bucket takes up very little space.

FIG. 13—GRADOMETER.

Indicator for Fuel Tank.

The presence of a fuel indicator may save the tourist the unhappy experience of running short of fuel miles from another source of supply and the ignominy of a tow or of waiting hours perhaps to have someone drive to town to bring back a can of gasoline. The indicator shown in Fig. 11 is intended to be inserted in the tank opening, taking the place of the ordinary filler cap. It operates by magnetism, the pointer following the movements of a permanent magnet,

the position of which is controlled by the height of the fluid in the tube. The device can be used in tanks in which air pressure is maintained on the fuel as well as in ordinary tanks. The indicator also serves a good purpose when refilling the tank by showing when the tank is nearly full, thereby preventing running it over and exposing the car and its occupants to danger of fire should the operation be performed at night.

Collapsible Wash Basin.

There are so many ways of soiling the hands when operating a car that when touring the driver's hands are usually in a state of griminess and covered with much oil and grease, the best excuse for washing them commonly being to wipe them off on a handful of cotton waste which is itself not by any means always clean. Many a man has wished for a chance to wash his hands after a repair on the road. This opportunity is afforded in a novel way by means of a folding water tank and wash basin (Fig. 12). This is made of rubber-covered canvas and when empty lies flat. Ordinarily, however, it would be carried full. To fill it, water is poured into the basin proper and allowed to run into the tank portion by removing the stopper shown. When filled, the stopper is replaced. The basin can then be used at any time by setting the device down, opening the stopper until the basin has run full and then replacing the stopper. At the side of the tank are straps to hold towels, as shown.

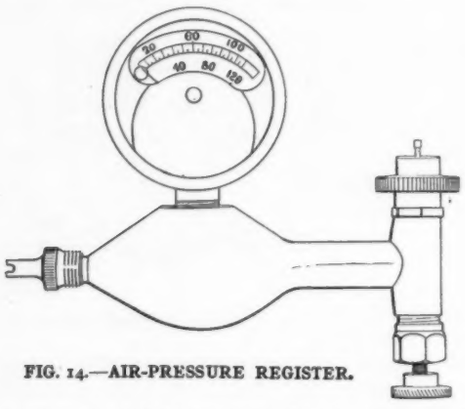


FIG. 14.—AIR-PRESSURE REGISTER.

Attachments for Indicating Grades.

Just for the satisfaction of knowing the gradients of the hills surmounted by one's car, a gradometer may be a desirable attachment. Instruments for indicating the degrees from the horizontal of a road surface are made in several forms, some on the principle of a carpenter's spirit level, having a glass tube bent to the arc of a large circle mounted in a metal case to be screwed in some safe place to a level part of the car. The tube is filled with alcohol except for one small bubble which floats at the highest point, and as this point in the tube varies with the angle the car assumes from the horizontal, the degrees from the level are indicated on a scale along the edge of the tube. Another style of gradometer is made for attachment to that convenient carry-all, the dash (Fig. 13). This is a mechanical device which indicates grades up to 35 per cent. by means of a moving pointer moving over a circular dial, the numbers being large enough to be read from the seat.

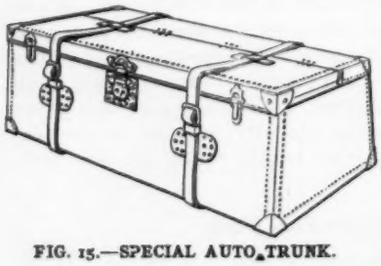


FIG. 15.—SPECIAL AUTO TRUNK.

Air-pressure Indicator.

The proper degree of tire inflation is almost impossible to guess or to determine with any degree of accuracy merely by observing the amount of bulging where the tires are in contact with the ground, by swaying the car sidewise to note the roll on the tires, or by feeling or kicking the tires, which are the usual tactics adopted. The pressure in each pair of tires should be equal, although the pressure in the rear pair should preferably be greater than in the front pair, owing to the heavier weight carried by them. To accomplish this result accurately the foot pump may be fitted with an air pressure register (Fig. 14). This attaches to the regular pump connection and indicates the pressure at every stroke of the pump plunger. To get a careful reading the plunger should be pushed almost to the end of its stroke until the tire valve opens and then held stationary for a moment until the pointer becomes stationary. The proper pressure depends of course on the type of car and the load the tires carry, but for ordinary gasoline touring cars seating four persons from 65 to 80 pounds is customary.

For Carrying Tools and Baggage.

So many things need to be carried on a car when a party of four is touring that ample provision must be made for stowing away the various tools and articles used strictly in connection with caring for the machine and for packing clothing and other articles for the personal use of the passengers. Of late it has become the practice to attach one or more capacious toolboxes to the running boards between the wheels. In addition, all the space under the rear seat is in most side-entrance touring cars made into a compartment having a large hinged door opening at the rear of the body. Owing to the adoption of side entrances, the practice in vogue now is to carry the passengers' personal effects on a metal rack attached to the rear of the car. There are to be had automobile trunks especially made to fit certain makes of cars. The one shown in Fig. 15 is an example.

FIG. 16.—REFRIGERATOR LUNCH BASKET

Luncheon Basket.

Another article of a nature allied to the foregoing is a refrigerator basket (Fig. 16). This has a small compartment at one end to hold ice, while the rest of the interior is intended for food and refreshments. Two sizes are made, one being 18 by 10 by 8 inches in dimensions and the other 20 by 13 by 10 inches. These are lined with material that is a non-conductor of heat and will keep their contents cold for a long time—eight hours, the makers claim. One of the most delightful experiences in touring is the wayside picnic lunch in the middle of the day. Night stops are always planned with a view to securing suitable hotel accommodations, but the noonday meal has perforce to be left largely to chance unless eatables are carried in the car. Too often, especially in the middle and far west, where towns are far apart, no hotels or restaurants that look at all inviting are passed during the middle of the day.

It is essential to enjoyment to keep always in mind the fundamental purpose of touring, which is to derive wholesome pleasure from the independent and exclusive action permitted by the automobile. No pains is ill taken that goes to increase that pleasure, and although the inexperienced are disposed to cumber themselves and their machine with too many useless things, as infrequent travelers by rail or water also do, it is doubtless better to err on this side than to fare forth incompletely equipped and unprepared for contingencies that could be foreseen.

INTERESTING BITS OF CLUB NEWS

North Jersey Automobile Club's Economy Run.

PATERSON, N. J., July 2.—It is the best thing that could happen that automobilists, individually and collectively, are gradually getting away from the idea that every club outing must be a mad race and that speed is the most important consideration in a car. It is becoming quite the proper thing for clubs to hold endurance and economy contests in which speed above legal limits counts for nothing. Automobilists are not so often heard claiming that they have gone a certain distance in a certain time, but that they have covered so many miles on so many gallons of gasoline, and with no mechanical troubles, and so on.

Very quietly the North Jersey Automobile Club, of Paterson, N. J., organized and carried out an endurance run on Saturday, June 23, starting from Paterson and running to Newton, a distance of 50 miles. The idea was to make the run as nearly a non-stop trip as possible. Stopping the engine was permitted, without penalty, if cars were delayed at railroad crossings, by tire troubles or restive horses, but adjustments could not be made without penalty. Stopping the engine while coasting was also allowed, provided the engine was started without stopping the car. Cars exceeding or falling short of the time limit of 2 1-2 to 4 hours were disqualified.

Out of fifteen starters fourteen finished, and many with the full percentage of 100; one per cent. was deducted for every minute's delay. The contestants and their scores were as follows: E. Fifield, 12-h.p. Franklin, 100; T. W. Milsor, 12-h.p. Franklin, 100; G. Rusling, 20-h.p. Franklin, 100; E. D. Carlough, 12-h.p. Franklin, 100; Wm. Beattie, 20-h.p. Stevens-Duryea, 100; E. M. Corbett, 20-h.p. Locomobile, 100; Frank Ryall, 20-h.p. Pope-Hartford, 100; George A. Post, Winton C., 16-h.p., 100; A. A. Cardinal, 35-h.p. Peerless, 97; 3 minutes adjusting vibrator; F. Bamford, 16-h.p. Reo, 94, clutch adjustment and stalled engine; Mrs. Hutton, 22-h.p. Buick, 100; Robert Beattie, Jr., 22-h.p. Buick, 100; C. Frost, 22-h.p. Buick, 80, very bad roads, trouble not chargeable to car; C. Horardt, 22-h.p. Buick, 70, very bad roads, trouble not chargeable to car; J. Garlick, 22-h.p. Buick, broke valve spring and did not finish.

Minneapolitans Have an Illuminated Parade.

MINNEAPOLIS, MINN., July 2.—The annual parade of the Minneapolis Automobile Club, held Friday evening, June 29, was one of the largest affairs of this nature that has ever been seen in the city. The machines were arranged according to size and price, the lamps were lighted, and the bodies of the cars were profusely decorated with flowers and ribbons. J. S. Spargo was in charge of the arrangements. Starting on Park avenue the parade went down Tenth street, and thence through the main streets of the city, winding up at the Plaza hotel, where the club rooms are located.

Prominent automobile men from the Twin Cities and Duluth have been planning to secure a road between the cities if possible. This would be highly pleasing to the enthusiasts residing in these districts, as it would afford them a delightful driveway for business as well as pleasure purposes. The Minneapolis and the Duluth clubs have already promised to subscribe funds toward assuring the success of the project.

The city officials have been pursuing an active campaign against indiscreet drivers, who of late have been driving over the public highways at a reckless and high speed. A number of arrests have been made, and the officials are determined to make others if necessary. They have the hearty commendation of the automobile club, which is now planning an amendment to the constitution that will blackball all members who are found violating the ordinance.

Buffalo in Danger of Losing Annual Show.

BUFFALO, July 2.—Owing to the inability to secure quarters the probability is that there will be no automobile show in Buffalo next year. Each of Buffalo's four shows has been held in Convention Hall during the same corresponding week annually and when the Automobile Club of Buffalo applied for its regular week in March, 1907, it was advised that Convention Hall has been rented to other parties for those dates. The local shows are on a circuit and consequently no other week can be used. The club will make an effort to secure the 74th Regiment Armory, but it is hardly possible this can be had.

It is practically certain that there will be no more automobile racing in Buffalo. Last week the Automobile Racing Association of Buffalo, formed of prominent members of the local automobile club, made application to Justice Pound in the Supreme Court for an order dissolving the organization. The dissolution proceedings were voluntary, the culmination of a recent conference of the directors of the association. It was stated in the petition filed with the Supreme Court that the association was formed in 1904 with a capitalization of $1,200. There is at present in the treasury $1,705. Two meets have been held by the association and both proved a success financially. Justice Pound issued an order requiring interested persons to show cause on September 25 why the association's petition should not be granted. William H. Hotchkiss, formerly president of the State Automobile Association, threatened some time ago to bring injunction proceedings in the Supreme Court if an attempt was made to continue automobile racing in Buffalo. The bad accident sustained by Webb Jay last year at Kenilworth track, is responsible for the trouble.

Three Difficulties with Rochester 100-Mile Route.

ROCHESTER, N. Y., July 2.—Unexpected opposition to the road race scheduled for Labor Day by the Rochester Automobile Club was encountered recently when County Engineer J. Y. McClintock gave out a statement concerning the tentative route that has been mapped out by the club for the 100-mile race, which is as follows:

First, there are eleven crossings of steam railroads at grades, so that each auto around the 25-mile circuit will cross the railroads 44 times.

Second, the bridge over the Genesee river, south of Scottsville, which will be used, is one of the longest cast-iron bridges ever erected. It is not in good condition, and has been condemned for everything except light loads at low speed. It is not considered worth repairing.

Third, the closing of 25 miles of highway in this country, to general travel, on a holiday, from 10 A.M. to 3 P.M., is unfair and unreasonable, especially as the only two improved roads entering the city from the south are included.

Three Hundred Worcester Orphans Enjoy Outing.

WORCESTER, MASS., July 2.—In spite of the clouds and the rain, the program planned for the orphans' second annual automobile outing was carried out Saturday, June 23, as arranged. It rained last year. This year's affair was more pretentious than its predecessor. The parade was made up into divisions by Chairman M. Percival Whittall of the runs and tours committee of the Worcester Automobile Club, and he had 46 cars in line. The automobiles assembled in Salem Square, a large open space in the rear of the City Hall. Here the parade was formed and started up Front street about 2 o'clock, being reviewed at City Hall by Mayor John J. Duggan. It proceeded out Main and Stafford streets to Pinehurst Park. Here the little waifs were given sweets,

horns, flags, dolls, and so forth, and Manager Caples gave them the run of the place. They spent about three-quarters of an hour at the vaudeville show, when the cars were again entered and a tour of the city and surrounding suburbs lasting nearly three hours followed. There were 300 orphans in the outing.

A Movement for Oiled Roads in New Jersey.

NEWARK, N. J., July 2.—President Frederick R. Pratt. of the New Jersey Automobile and Motor Club, is a stanch advocate of the plan of oiling the highways for the suppression of dust, and believes that when the dust nuisance is abolished the feeling against automobiles in the country districts will, in a large measure, be abated. So strong is the feeling in the club in favor of the movement that the members have decided, with the permission of the board of freeholders, to oil about four miles of Newark's streets, which are most used by autoists, as an experiment. One argument that has been brought against the road-oiling idea is the effect of the petroleum on the tires. President Pratt thinks the light oil used will not have a material effect on the rubber, and by making the roadway better generally its deteriorating effects on the rubber would be neutralized in other directions.

Work started to-day on the alterations necessary to make the new home of the New Jersey Automobile and Motor Club suitable for occupancy. Operations will be pushed as rapidly as possible, and it is hoped to have the new quarters ready by August 1.

Houston Making Arrangements for an Orphans' Day.

HOUSTON, TEX, June 30.—At a meeting of the Houston Automobile Club, held last week, it was voted to become an incorporated body, and the club officers will take steps to that end at once. The club project for giving the orphans of the city an afternoon's outing was discussed, and it was unanimously voted to have an orphans' day at an early date, the details to be left with a special committee to be appointed by the president.

The Fourth of July races at the driving park, under the auspices of the club, promise to prove very interesting. At this writing there are over twenty entries. The program includes a number of special match events between the various makes of machines sold in Houston.

CLUB DOINGS IN GENERAL.

BINGHAMTON, N. Y.—An orphans' outing is being arranged by the Binghamton Automobile Club. The children of the two homes in the city will be taken for an afternoon trip at a date to be decided on by the committee in charge, some time during the present month.

PEORIA, ILL.—The race meet of the Peoria Automobile Club held June 23 was a pronounced success, the feature of the meet being the win of Barney Oldfield from Paul Albert and Jesse Barker, in the five-mile open, in which he covered three miles at an average of 0:56, a state record.

WORCESTER, MASS.—The Worcester Automobile Club will conduct a long distance automobile tour for its members some time this season. The matter was placed in the hands of the runs and tours committee, consisting of Chairman M. P. Whittall and Messrs. Sargent and Harrington.

WILMINGTON, DEL.—At the last meeting of the executive committee of the Delaware Automobile Association, which was held a few days ago, the bad condition of some of the turnpikes leading into Wilmington was considered and it was decided to notify the companies to make repairs, and if the desired improvement is not made the members are to be requested to refuse to pay toll, which will probably result in a court ruling as to whether the turnpike companies are required to keep their roads in proper condition.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Tours.

July 7...—Rochester, N. Y., Automobile Floral Parade at Genesee Valley Park, Rochester Automobile Club.
July 10...—Buffalo, N. Y., Orphan's Day, Automobile Club of Buffalo.
July 12-28—Annual A. A. A. Tour, Chicago to Bretton Woods, N. H. Rules for the Glidden Trophy operative from Buffalo.
July 24-Aug. 2—New York to Boston and Bretton Woods, N. H., and return to Boston. (Will meet Glidden Tourists at Bretton Woods.) Entries with W. J. Morgan, New York, before July 20.
July 26-Aug. 2—Boston to Bretton Woods and Return, Bay State Automobile Association. (Will meet Glidden Tourists at Bretton Woods.)
Aug. 22-25—Asbury Park, N. J., Automobile Carnival.
Sept.....—500-mile Endurance Test, Grand Rapids (Mich.) Automobile Club. (Date to be announced later.)
Oct. 1-2...—St. Louis, Mo., Automobile Parade and Carnival, St. Louis Automobile Club.
Sept.....—200-Mile Road Race, for the Farson Cup, Chicago Automobile Club. (Date and course to be announced.)

Race Meets and Hill Climbs.

Sept. 2...—100-Mile Road Race, on 25-Mile Circuit in Monroe County, N. Y. Rochester Automobile Club and New York State Automobile Association.
Sept. 22...—American Elimination Trials for Vanderbilt Cup Race. (Long Island Course probably.)
Oct 6....—Vanderbilt Cup Race, American Automobile Association.

Motorcycle Tours and Contests.

July 3-7..—Annual Endurance Run and Meet, Federation American Motorcyclists, Rochester, N. Y.
July 4...—Tour to Rochester, N. Y., New York Motorcycle Club.

Motor Boat Races.

July 13-21—Annual Cruise American Power Boat Association, Port Washington, L. I., to Shelter Island, stopping at Norwalk, Thimble Islands, New London, Newport and Block Island.
Aug. 4....—Buffalo, Motor Boat Club. 15-Mile Race for Glasgow Cup, on Niagara River course.
Aug. 21-23—Gold Challenge Cup, American Power Boat Association, on St. Lawrence River at Chippewa Bay.

FOREIGN.

Shows.

Sept. 1-8..—Canada International Exhibition, St. John, New Brunswick.
Oct. 5-14.—Leipzig (Germany) Exhibition, Krystall Palast.
Nov. 1....—New Zealand International Exhibition opens at Christchurch.
Nov. 1-16.—Berlin (Germany) Automobile Exhibition.
Nov. 15-24—London, Olympia Motor Show.
Nov. 23-Dec. 1—London, Stanley Show, Agricultural Hall.

Races, Etc.

July 8....—International Cup Race for Motorcyclists, Cesky Club Motorcyclistu of Austria.
July 15....—Suze-Mont Cenis Hill Climb (Italy). Automobile Club of Turin.
Aug. 1-15—Circuit des Ardennes (Belgium).
Aug. 9-12—Malchamps (France) Hill Climb Tests.
Aug. 15-16—Ventoux (France) Automobile Meeting.
Aug. 14-19—Ostend (Belgium) Meet.
Aug. 18...—Liedekerke Cup Race.
Aug. 23...—Semmering Hill Climb.
Aug.27 Sept. 2—Brescia (Italy) Automobile Meeting.
Sept. 3...—Auvergne Cup Race, France.
Sept. 27...—Tourist Trophy Race, Isle of Man, A. C. of Great Britain.
Oct.7...—Chateau Thierry (France) Hill Climb.
Oct. 23...—Gaillon (France) Hill Climb.

Motor Boat Races.

July 8....Le Coupé Dubonnet (France) Motor Boat Races.
Aug. 6....—Motor Boat Race on the Rhone (France).
Aug. 9....—British International Cup Motor Boat Race.
Aug. 20-23—Ostend (Belgium) Motor Boat Races. Dover to Ostend.
Sept. 16...—Juvisy (France) Motor Boat Meeting.

TWO FIRESTONE TIRE BRANCHES.

Two branch houses have recently been opened, one in Chicago and the other in Boston, by the Firestone Tire and Rubber Company, of Akron, O., for the sale and repair of Firestone solid and pneumatic tires. Both these places are modern in style and characteristic of a growing business. The Chicago house, at 1442

CHICAGO BRANCH, FIRESTONE TIRE & RUBBER CO.

Michigan avenue, is 25 feet wide, 171 feet deep, and two stories high, and has a basement the full size of the building. The front is of gray stone, of attractive appearance, and the office within is handsomely but quietly finished and furnished in Colonial oak.

In the workshops are all necessary machines and tools for repairing and attaching both solid and pneumatic tires, all such work being done on the second floor. Stocks of tires for automobiles are carried on the ground floor, while in the basement are carriage tires and channel rim stock.

At the Boston branch is found, in addition to tire handling facilities, a blacksmith shop, where rim work is done under the direct supervision of the manager of the branch house. The location, 9 Park Square, is in the heart of the automobile district. Stocks of Firestone solid and pneumatic tires are carried here also, and the place is equipped with everything necessary to handle Firestone tire work.

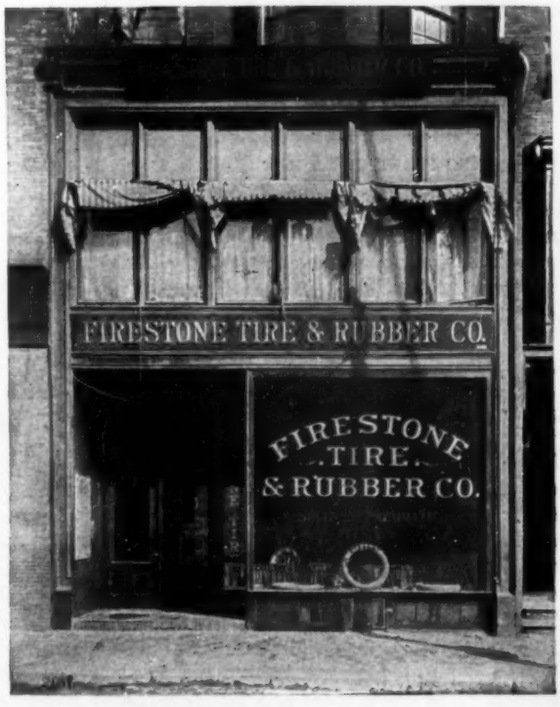
REQUIREMENTS OF AUTOMOBILES FOR EGYPT.

Consul-General L. M. Iddings reports from Cairo that Egypt is a poor country for automobiles, but prospects for their use are better. He writes:

"They can be used now only for a few miles in and about Alexandria and Cairo. There is no road proper from Alexandria to Cairo, only camel paths. At Cairo the longest drive is eight miles out to the Pyramids and four or five miles in the other direction to Abbassiah. The trip has been made to Ismailia, but the road is terrible. However, many automobiles are seen in both cities, and it is asserted that a large garage will be constructed in Cairo for next winter. The government also will use automobiles in the police inspection service in the desert region lying between Edfur and the Red Sea—that is the gold-mining country which is now being considerably exploited. The desert offers almost natural roads, and it is estimated that it will cost only from $5 to $10 per mile to make them perfect. The experiment has succeeded well so far, and police inspection, formerly made on camels and consuming for each trip six weeks, can now be made in two weeks. The main obstacle the machines encounter is the drifting sand and the heat. There are two agencies in Cairo for selling automobiles and two in Alexandria. Machines are registered in Cairo to the number of 175, and 66 in Alexandria. There is an automobile omnibus company in Cairo with a capital of $500,000. At present four automobiles are running, and eleven more will be put on soon. For the benefit of motor-car manufacturers I give the following extract from a memorandum of the Governor of the Soudan:

"A car of suitable design for the Soudan should embody the following details: Powerful engine; metal wheels; substantial gear-box, with high and very low gears; efficient radiation; clutched to withstand frequent slipping; strong springs; weight suitably distributed on the frame; carrying capacity for large supply of fuel and water, spare parts, and a certain amount of luggage; and all working parts must be carefully inclosed as a protection against sand.

"Motor cars for the eastern desert district of Egypt (the mining district), however, should come within the following specifications: Light cars, capable of carrying two people and hauling two in trailer; water and radiator value up to 100 miles at average mean speed of 10 miles per hour; petrol capacity, 120 miles; cars well sprung fore and aft on long springs; pneumatic wheels for cars averaging 15 miles per hour; cushion or solid tires for cars averaging 10 to 12 miles per hour; power, 6 to 12 horsepower for light cars, 9 to 15 for heavy; light cars to average 15 miles and heavier 10 to 12, and pull 7½ hundredweight plus weight of trailer; front wheels, 36 to 42 inches diameter, with 4 to 6 inches face; rear wheels 26 to 32, with 5½ to 9 inches face; engine, two cylinders, simple, and as near fool proof as possible; firing accumulator and coil, also magnet, methods unchangeable; gear can not be too simple or strong; reverse on heavy cars, but not on light; speeds, two— top 12 to 15, bottom 3½ to 5; pedal clutch; pedal brake and lever brake, former on front wheels, latter on back; engine speed not over 1,000 per minute; lubricating as near automatic as practicable; lights, carbide, with lens fronts; oil tanks not less than 200 miles capacity; carbureter, approved float type. Essentials: Light and strong, easy on track, as near fool proof as possible."



BOSTON BRANCH, FIRESTONE TIRE & RUBBER CO.

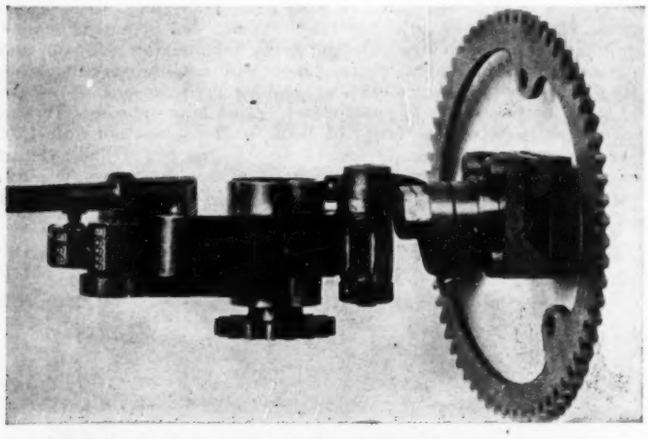
AN ELECTRIC SPEED INDICATOR.

. In these days of speed restrictions, of long automobile trips, of claims for speel that require to be substantiated, there are comparatively few large cars that are without some sort of speed indicating instrument. Starting out with the old reliable centrifugal governor principle, various operating mechanisms have been employed, including oil pumps, air pumps, and so on. One of the latest employs electricity, the device consisting of a complete electric generating plant connected up to an indicating instrument. The diminutive generator, weighing but a pound, is of the magneto type, delivering an alternating current, and is attached to a steering knuckle and gear-driven from the hub of a front wheel. The faster the car moves the faster the little generator is driven, and the stronger the current generated. The current is conducted to the indicating instrument on the dashboard by a heavy flexible cable. The indicating instrument is practically a very sensitive volt-meter, but the dial is graduated to read in miles per hour instead of volts.

INDICATOR DIAL.

The shaft of the generator is of steel, hardened and ground, and runs in ball bearings. The manufacturers state that no attention is required beyond lubrication twice each season. A dustproof casing incloses the geenrator and protects it from dust, mud and accidental damage.

The indicating instrument is mounted on an adjustable angle bracket; the dial is silvered and the figures are black, raised above the surface of the dial. The pointer commences to move as soon as the car gets under way, and, the makers state, remains perfectly steady regardless of the roughness of the road. The instrument is 4 1-2 inches in diameter. This indicator is manufactured by C. E. Lipman, of 136 W. Grand avenue, Beloit, Wis., and is sold at a very moderate price.



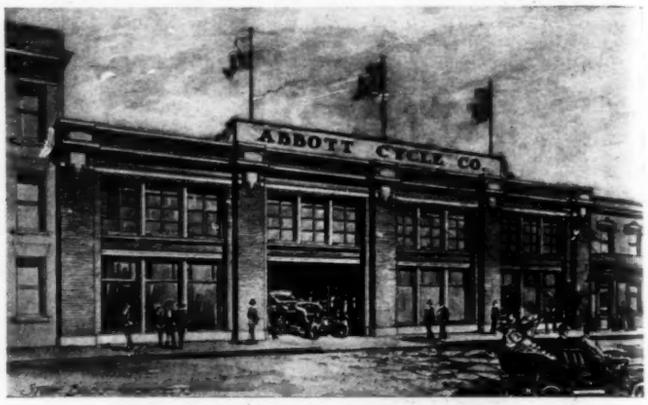
GENERATING PLANT OF LIPMAN ELECTRIC SPEED INDICATOR.

MONTREAL WILL HAVE ANOTHER SHOW.

MONTREAL, July 2.—R. M. Jaffray, the manager of the late automobile shows held in Toronto and Montreal, has just returned from the West and completed arrangements for the second annual show, which will open in Montreal in the Arena Rink, April 8, 1907. Every manufacturer in Canada, and every line of automobile now in Canada from England, America, France and Belgium will be represented by their local agents not only from Montreal but from Toronto. It is also planned to include a sportsman's exhibition similar to the New York and Boston shows, and display complete lines of motor boats and marine motors. Plans for the show will be issued in September.

A PROSPEROUS SOUTHERN AGENCY.

It is a tribute to the importance and stability of the automobil business that the buildings used for garages and salesrooms ar frequently of the best class, and automobile dealers are sparin no efforts to bring their establishments up to the modern stand ard. New buildings are constantly going up and, as a rule, eac new building embodies something new—some feature that make for safety, or convenience, or facility of handling cars or som other desirable object. Among the new garages is one in cours of construction for the Abbott Cycle Company, of New Orlean La., a concern well known in the bicycle business before taking u the automobile. The new building, which is being erected o



GARAGE OF ABBOTT CYCLE CO., NEW ORLEANS, LA.

Baronne street, will be of steel, concrete and pressed brick, and the dimensions will be 100 by 100 feet, of which 75 by 100 feet will be devoted to the garage proper. One of the important features of the structure will be the fact that there will be no posts or other inside supports for the roof. The roof and the floor of the second story will be supported wholly by great steel trusses. This, together with the eighteen-foot main entrance and a huge electric elevator, will go a long way toward making the handling of cars easy. Gasoline will be stored underground and pumped into tanks in the garage by self-measuring pumps.

The store or sales department will occupy a section of the building 25 feet wide, and the now usual waiting rooms and other comforts for customers and patrons will be provided.

On the second floor will be the repair shop, fitted up with machine and hand tools for doing all kinds of repair work. Large skylights in the roof will admit an ample supply of light. In addition to garage work, the Abbott company will handle the Peerless, Packard, Oldsmobile and Baker electric machines. It is expected that the new building will be ready for occupation by October 1 next.

FRANKLIN TOURING CAR IN RACING TRIM, MERIDA, MEXICO.

SOME INCONGRUITIES OF HILL CLIMB TESTS.

Editor THE AUTOMOBILE:

[338.]—Referring to the various hill climbs which are now being held in all parts of this country and abroad for automobiles, it is to be presumed that outside of providing an interesting afternoon's sport that they should demonstrate in some way the relative merits of the cars taking part in them. At present, however, I think that the value of these tests, so far at any rate as the public is concerned, is very considerably discounted by the different methods adopted in the classification of the cars. In some cases, an arbitrary formula is used to determine the horsepower of the engine, and this system, if a really reasonable formula was arrived at to determine the engine power, if adhered to by every club throughout the country, would, I think, eventually lead to useful results, but at present, the results are far from useful.

For example, take the case of the 40-horsepower six-cylinder Napier, in some recent hill climbs in England. At Frome Hill Climb, the formula there classed it as a 32-horsepower car. If, however, the same car is run in the Birmingham Hill Climb, it is only called a 30.47-horsepower car and in view of the fact that the Frome Hill Climb does not take the least account of length of stroke, it is obvious that their formula is a thoroughly bad one. The Birmingham formula which takes into some account the stroke, seems to me far and away the best and most useful hill climbing formula that we have at present, and if a fair formula of this sort could be adopted as a standard by the Automobile Club and used throughout the country for say a year and then all the results carefully considered at the end of the year by the technical committee of the Automobile Club, I feel sure that modifications and suggestions could then be brought into force from year to year that would make these hill climbing competitions really useful to the public, and to makers of motors and at the same time, make handicapping by them really fair and interesting.

To still further show the extraordinary variation in the system of holding these hill climbs, we will just take South Harting where the speed of the different horsepower cars are supposed to be brought together by price. Could anything be more futile than this, and last year when this same competition was held under these conditions, I was actually told by an official in connection with the trials that the reason the price of the cars competing in this competition had been limited to £850 was because the promoters of the competition did not wish very powerful cars to compete. Could anything be more ridiculous than to suggest that a price of £850 for the chassis would prevent a powerful car competing? There are many cars of 50 horsepower and more, to be bought at this figure, so that the competition, although it makes an interesting afternoon's sport, is really useless as an educational competition to everybody concerned.

When we come to Aston Hill Climb promoted by the Herefordshire Club, here we have an even worse state of affairs. There appears to be no limit to horsepower, no limit to price, but the cars, it is stated, must be fully equipped touring cars. No indication is given as to how many people are to be carried, and what is a touring car, is not defined.

Now it seems to me that this is bad as it leads to protests and misunderstandings which never need arise if some good rating rule on the lines of the Midland Club was universally adopted, tried throughout a whole season, and then at the end of the season, thoroughly criticised by the results and gradually improved from year to year, and directly cars were inclined to strike out into undesirable directions, then the formula could be so altered as to place at a discount this particular direction of development.

I trust that this matter may have some ventilation in your columns and trust opinions from others may be given with the hope of getting something done before next year's competitions start, and that some competition be held during the present season under what might be considered ideal conditions at the moment. I feel sure the same difficulties exist in America, and might be ventilated with advantage.

London, Eng., June 15. S. F. EDGE.

DISSOLUTION OF THE GERMAN A. A.

At a meeting at Frankfort, attended by nearly a hundred delegates under the presidency of the Duke of Ratibor, it was resolved to dissolve the German Automobile Association, which has in truth been nothing more than a name, all the power being really vested in the Imperial A. C. The G. A. A. might have been a most influential corporation, but as its committee was to some extent that of the Imperial Club, it never had the chance it should have had. Prince Henry of Prussia, who was present during the meeting, spoke, laying down his patronage of the deceased body, and therefore, as he facetiously remarked, "assisting at his own funeral."

RUNABOUT THAT HAULS A LADDER TRUCK.

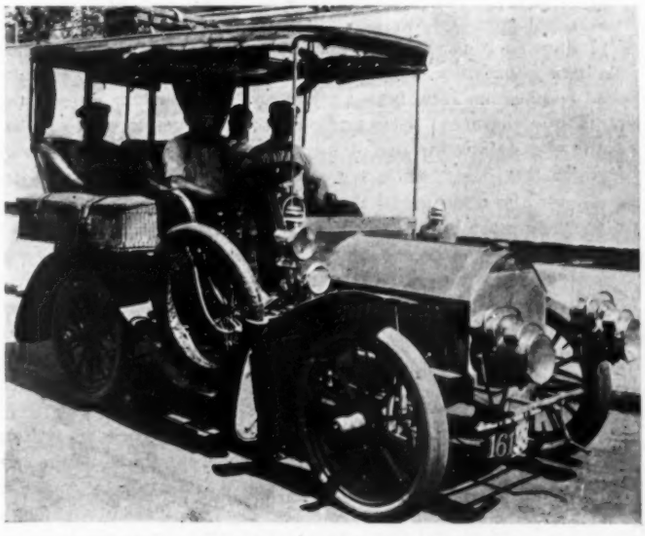
In Tarrytown, N. Y., the streets have a way of running up and down hill that is very disconcerting to the horse whose driver is in a hurry. But the Maxwell cars, made in that town, being born among the hills, find no difficulty in surmounting them. So when,

MAXWELL RUNABOUT THAT PULLS THE TARRYTOWN FIRE TRUCK.

one day, a pig piece of fire apparatus—a tower wagon weighing two tons—stuck on a steep pitch, a telephone message was sent to the Maxwell-Briscoe Motor Company's factory, and in response a runabout was hurried to the hill and hooked onto the stalled wagon, and helped the horses out. The way in which the little gasoline runabout yanked the tower wagon up the hill has resulted in the addition of a Maxwell runabout to the fire fighting apparatus of the town.

A CAR WITH A 40,000 MILE RECORD.

Cars that run and keep on running, even when the conditions are not the most favorable, are not as scarce as they used to be, but when an unusually good performance is brought to light it is always interesting. The engraving shows a 16-22-horsepower Locomobile, delivered to Joy Morton, of Chicago, in May, 1904, which has since that time been almost constantly on the go and has traveled 40,000 miles—an average of about 55 miles a day for the whole time, winter and summer, Sundays, holidays, and week-days. The machine has been in the ditch twice, but is still on deck, hale and hearty, and in excellent running order. At



JOY MORTON'S 1904 LOCOMOBILE THAT HAS RUN 40,000 MILES.

present it is making a tour from New York to Chicago, carrying two sons of Mr. Morton and a friend, all Princeton boys. A fourth went as far as Utica, but had to leave the party, as he was booked to go abroad.

THE AUTOMOBILE

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Indicating High Speed Explosion Motors.

In this issue we publish a description of an apparatus for indicating high speed internal combustion motors, known as the "manograph," which is a good example of the type of instrument in which a reflected ray of light gives a graphic record of the work done in the cylinder. That the ordinary form of indicator has been practically useless for obtaining diagrams from high speed engines has long been a matter of regret on the part of the automobile engineer. It is perhaps too early yet to predict what results may follow the use of the new reflecting type of indicator of which that described is a good example. Everything will depend upon the accuracy of the record made by such instruments, or if error must be an accompaniment of their use whether or not such error will be constant and measurable, as the change in rate of a chronometer, for example. From the experience had up to the present, however, there is no reason to believe that three is any inherent defect in the system. It opens up a wonderful range of possibilities in the direction of improvement of the automobile explosion motor and of its necessary attachments, such as ignition and cooling apparatus. The "cut and try" methods of the past have produced remarkable results, though of necessity the rate of improvement has been slow. With the use of the indicator, however, the engineer will be able to make a close estimate of results before the "try," the closeness depending upon his skill and the possession of that peculiarly valuable quality known as engineering sense—a technical form of plain common sense. It is the direction of refinements, of course, that the indicator will be principally valuable, and its aid will be especially useful in the working out of the alcohol motor. Unlike the much talked of storage battery, however, its use will not provide the automobile for the masses; rather will it be employed by those who turn out the more expensive class of machines in which thermodynamic efficiencies are supplemented by mechanical excellence in materials and construction.

The avenues of inquiry which the indicator opens up are multitudinous and are not gone into in the article referred to. It is simply a plain exposition of the manograph and its functions. We hope subsequently to give the results of a more extended use of the apparatus.

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Unusual Chance for Truck Builders.

An unusual opportunity is given the manufacturers of motor trucks to demonstrate the capabilities of their vehicles this summer in the national army maneuvers. The conditions for these trials are the most liberal ever offered. No entrance fee is to be charged, and instead of requiring the competitor to pay his expenses, the War Department is to pay him for the work done by his truck.

Recommendations to this end by the Assistant Quartermaster-General have been approved by the Quartermaster-General of the United States Army and the chiefs in charge of securing transportation for the summer movements have been instructed accordingly. Detailed information can be secured by communicating with them or with the Quartermaster-General at Washington.

The movement of the regulars will begin about July 15. The infantry will be required to march 200 miles and the cavalry 250 miles, each way, the Quartermaster contracting for such transportation service as may be necessary to accompany the troops. With the hope of learning valuable points about motor traction, authority has been granted to charter automobile and traction engines at reasonable rates. No restrictions are to be placed upon the kind of motor or power employed, and the trials are open to all manufacturers, who are to provide their own drivers and mechanics and furnish their own fuel. Payment for the service is to be based upon ton mile work done.

Although no trucks are to be bought for this summer's work, these trials will open the field to the maker of the truck which in all ways proves its superiority over the government mule service to secure large contracts to furnish trucks to the War Department. Foreign war offices will also be interested in the results, for any truck that gives satisfaction over American roads should be adapted to use in army transport work in most other countries.

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The Question of High Grade Gasoline.

Announcement by the big corporation controlling the petroleum products of the country, that it will not be able to supply 74 and 76-degree gasoline in the future, owing to enormous demand and insufficient supply, need not unnecessarily alarm the buying public, ninety-nine per cent. of which are automobile and motor-boat owners. For the past two years at least there has been a gradual lowering in the grade of gasoline supplied to automobilists by the producing corporation, and the real 76-degree article has been growing scarcer than snowballs in midsummer. The lower grades of gasoline which have been supplied have proven efficacious as motor fuel, and in fact their driving energy is practically as great as the more refined article, although the readiness with which their gases carburate is not as apparent.

With improved carbureting systems 70-degree gasoline, and even as low as the 68-degree grade, can be used without inconvenience, in fact, is being used to a large extent at the present time. The announcement by the Standard Oil Company of its withdrawal of the high grades from the market will fool no one who has studied the question, and is merely designed to let the public, which has been paying at 76-degree price for a 70-degree article, down easy.

ENTRIES FOR THE VANDERBILT.

Up to within a few hours of the closing of the entry list for the Vanderbilt Cup elimination trials fifteen American cars had been entered, and three Mercedes cars, constituting the German team, had been entered by cable. The entries of the five Italian cars were published two weeks ago in these columns. The American entries are as follows:

Pope-Toledo, 120 horsepower, entered by Albert L. Pope; driver, Herbert H. Lyttle.

Oldsmobile, entered by George Moore Smith; driver, Ernest D. Keeler.

Thomas, 115 horsepower, entered by Harry S. Houpt; driver, Montagu Roberts.

Thomas, 115 horsepower, entered by C. A. Coey; driver, Herbert Le Blon.

Thomas, 115 horsepower, entered by E. R. Thomas; driver, Gustav Caillois.

Haynes, entered by Haynes Automobile Company; driver, Frank Sweigert.

Frayer-Miller, 110 horsepower, entered by J. F. Stone; driver, Lee A. Frayer.

Frayer-Miller, 110 horsepower, entered by W. J. Miller; driver, F. E. Moscovics.

Frayer-Miller, 110 horsepower, entered by Oscar S. Lear; driver, E. H. Belden.

Christie, 110 horsepower, entered and will be driven by Walter Christie.

Locomobile, 90 horsepower, entered by S. T. Davis, Jr.; driver, Joseph Tracy.

Maxwell, entered by the Contest Branch of the Maxwell-Briscoe Motor Company.

Apperson, 80 horsepower, entered by Elmer Apperson; driver, George Robertson.

Breese, Lawrence & Moulton car, entered by the builders.

Matheson, entered by the builders.

Three Mercedes cars were nominated by cable from the German Automobile Club, but no details were given. A German team is therefore assured. Up to the time of going to press there was still a possibility of hearing from entrants whose papers had been mailed before the last hour, but not yet received by the secretary. Among these possibilities are the Wayne "twins," which were looked upon as certain entrants, and are said to be on the road. The air-cooled Frayer-Miller cars are said to have already shown up well under actual work, the cooling system performing its work thoroughly.

Characteristics of the Maxwell Racing Cars.

The contest branch of the Maxwell-Briscoe Motor Company, of Tarrytown, N. Y., on Thursday, June 28, entered two cars for the Vanderbilt Cup race. One car has an engine with twelve (12) horizontal, opposed cylinders of 6 1-4 inches bore and 6 1-4 inches stroke. In this care the cylinders are placed crosswise of the car, arranged six on a side. The second car has eight (8) vertical cylinders, of five-inch bore and five-inch stroke, placed in a line fore and aft, or a doubling up of the Maxwell standard four-cylinder car.

The Maxwell-Briscoe people claim that the twelve-cylinder car has the largest piston displacement of any automobile motor yet constructed, and state that in making a twelve-cylinder car the opposed horizontal cylinder type of motor is most necessary, because a car with twelve vertical cylinders would be so long as to be impracticable. At the same time as all Maxwell cars that have been sold up to date are of the horizontal type, the company believes this racing car will demonstrate that its faith in the horizontal type of motor is well founded. In effect the makers believe, outside the fact that it is necessary from an engineering standpoint to construct the twelve-cylinder motor with horizontal cylinders on account of its compactness, that this car will demonstrate that the horizontal motor is fully as efficient as the vertical type when made with care.

RACING AT PHILADELPHIA.

PHILADELPHIA, July 2.—The management of the Belmont Driving Club on Saturday last gave the first of a series of automobile race meets for amateurs, which it proposes holding at its pretty mile track at Narbeth, about six miles outside the city, on the main line of the Pennsylvania Railroad. While the affair cannot be said to have been much of a success from the box-office viewpoint, the five regular and six special events afforded lots of amusement to the contestants, and not a single accident occurred to mar the sport. The fastest time of the day was made by William Gill's 20-horsepower White steamer—1:07 flat. Gill rounded out his afternoon's work by winning the five-mile for runabouts costing less than $1,000, the five-mile free-for-all and a five-mile match race against J. L. Munyon's 20-horsepower Locomobile.

A special event, open only to Maxwells, was won by W. M. David's 20-horsepower car and a similar race for Autocars went to H. W. Whiting, who kept his 24-horsepower machine in front all the way.

The race of the day, a special event for cars rated at $2,750 or over, was marred by the refusal of the other entrants to start if Gill's White steamer was allowed in. The protest was based on the fact that the White was stripped down almost to racing trim, while the Jackson and Packard were in touring shape. These two cars were sent off alone, but W. H. Owens, in the Jackson, claimed a foul when the Packard cut in ahead of him on the second mile and caused him to hold back to prevent a smashup. In the run-over E. Lash, in the Packard, got away in the lead and gained gradually throughout, finishing the five miles a full quarter to the good, in 6:16 3-4, the best time for the distance during the day. Gill tried to induce Lash to try conclusions in a special race for glory, but the latter couldn't see his way clear to accept, saying it would take too long to strip his car down to an equality with the steamer.

BUFFALO COUNTRY CLUB'S GYMKHANA.

BUFFALO, N. Y., July 2.—The Country Club on Saturday gave its first automobile show, and despite the thunderstorm, which somewhat marred the pleasure of the afternoon, the departure in the form of entertainment was voted a brilliant success. Horse shows with the Country Club are plentiful; so are polo games, but an automobile show by this social organization was an innovation that is bound to find repetition. The members of the club paraded around the grounds and then had contests. The first event was that for the expert chauffeur, only in this case the employers took the part of the chauffeurs. Robert K. Root won first prize and John M. Satterfield got second.

After this event there was a general parade, in which sixty odd machines took part. When the parade was finished the judging of cars with inclosed tops took place. Frederick H. Stevens got first; Henry H. Littell got second. The slow race was a novel feature and was won by John M. Satterfield, who drove a five-year-old machine with wire wheels. The water race was exciting, as it not only tested the nerve of the driver in speeding his car, but the nerve of his fair companion who carried a glass of water. Two heats were necessary, as the first ended in a tie. Mr. and Mrs. Seymour D. White won first prize, with Mr. and Mrs. Frank L. Bapst second.

The gymkhana was another feature of the programme. The contestants were required to speed their cars to the first stopping place, get out, take off their coats and light cigars, then speed to the second stopping place, alight and drink a glass of water, then to the third stopping place, put on their coats and each light another cigar. S. S. Spencer won first prize, Charles Williams second, and Dr. W. H. Glenny, Jr., third prize. The obstacle race was fairly started when the thunderstorm broke. Some of the contestants had successfully avoided dummy policemen, servant girls and valets, but couldn't dodge the storm and the race was called off.

MORE GLIDDEN TOUR ENTRIES.

Beginning with the start of the Glidden Tour from Buffalo, the checking system, on which rests the value of the contest, will be inaugurated. Checkers will be sent forward by patrol car early in the day and deposited at the points named in the daily schedules. Each of these checking stations will be designated by a flag. As each car passes each checker the latter will enter on a record card the hour and minute when the car passes. The actual time of passing will have to coincide to the minute with the schedule time in order that the car may escape a penalty. For each minute the car is ahead of its schedule time it will be penalized one point. The double penalization for being ahead of the schedule is to prevent racing, the daily schedules being arranged on the basis of the maximum legal speed limits, with allowances for various delays, such as filling tanks, traffic delays, etc. Such checking will be done each day at points averaging twenty-five miles apart and at the conclusion of each day's run. In this way the entire tour is divided into forty-four checking sections, and the driver who comes nearest to maintaining the prearranged schedule each day will receive the lowest penalization, and will therefore become the winner of the trophy.

Each driver will receive a card at the time of checking out in the morning, which will state the time allowed to make each checking station and the exact hour and minute when he must arrive at the night-stop, so that he can estimate his running during the entire day and at all times. Garage officials and checkers will compare watches at the beginning of each day's run and there will be no appeal from the time as registered by the various official watches.

A second patrol car will follow the last starter and will pick up the various checkers and carry them to the night stop. This car will also render aid to any cars in distress by carrying messages to the nearest towns and apprising the tour officials of the difficulties should such occur.

Additional Entries During the Past Week.

No. 19.—Webb Jay, c. o. White Sewing Machine Co., Chicago, Ill. Chicago to Bretton Woods. Will contest for Glidden Trophy. White car of 18 horsepower. Four in party. Chicago Automobile Club.

No. 20.—Elbert Milton Wiley, c. o. New York Yacht Club, New York City. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Clement-Bayard car, 24-30 horsepower. Five in party. American Automobile Association.

No. 21.—Elwood Haynes, c. o. Haynes Automobile Co., Kokomo, Ind. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Haynes car of 50 horsepower. Five in party. Chicago Automobile Club.

No. 22.—Paul H. Deming, Chairman of Touring Committee, A. A. A., Grosse Pointe Farms, Mich. Buffalo to Bretton Woods. Will not contest for Glidden Trophy. White steamer of 18 horsepower. Two in party. Automobile Club of Detroit. Will be used as committee car.

No. 23.—Joseph A. Mechaley, c. o. Mechaley Automobile Co., Stamford, Conn. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Pope-Hartford car of 20-24 horsepower. Four in party. American Automobile Association.

No. 24.—C. W. Kelsey, c. o. Maxwell-Briscoe Motor Co., Tarrytown, N. J. Buffalo to Bretton Woods. Maxwell car of 36 horsepower. Will not contest. Five in party. New York Motor Club.

No. 25.—Charles F. Barrett, c. o. The Electric Vehicle Co., Hartford, Conn. Buffalo to Bretton Woods. Columbia car of 24-28 horsepower. Will contest for Glidden Trophy. Five in party. Auto Club of Hartford.

No. 26.—Frederick J. Pardee, 1218 Michigan Ave., Chicago, Ill. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Packard car of 24 horsepower. Five in party. Chicago Automobile Club.

No. 27.—Percy P. Pierce, c. o. George N. Pierce Co., 752 Main St., Buffalo, N. Y. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Pierce Great Arrow car of 40-45 horsepower. Four in party. Automobile Club of Buffalo.

No. 28.—Archie E. Hughes, c. o. Foss Hughes Motor Car Co., Philadelphia, Pa. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Pierce Great Arrow car of 40-45 horsepower. Four in party. Rhode Island Automobile Club.

No. 29.—H. E. Shiland, c. o. Buick Motor Car Co., Jackson, Mich. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Buick car of 30 horsepower. Four in party. American Automobile Association.

No. 30.—W. C. Durant, c. o. Buick Motor Car Co., Jackson, Mich. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Buick car, 22 horsepower. Four in party. American Automobile Association.

No. 31.—Augustus Post, 31 Nassau St., New York City. Buffalo to Bretton Woods. White car of 18 horsepower. Automobile Club of America.

No. 32.—Benj. W. Richert, c. o. Packard Motor Car Co., New York City. Buffalo to Bretton Woods. Will not contest for Glidden Trophy. Packard car of 24 horsepower. Three in party. New York Motor Club.

No. 33—Watson Coleman, Bay State Automobile Association, Lynn, Mass. Buffalo to Bretton Woods. White car, 18 horsepower. Non-contestant.

No. 34.—John W. Breyfogle, c. o. Gearless Transmission Co., Rochester, N. Y. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Gearless car of 50 horsepower. Four in party. Rochester Automobile Club.

No. 35.—C. Henry Fosgate, Quincy, Ill. Chicago to Buffalo. Will not contest for Glidden Trophy. Three in party. Chicago Automobile Club.

No. 36.—W. W. Burke, c. o. Electric Vehicle Co., 134 West 39th St., New York City. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Columbia car, 40-45 horsepower. Four in party. New York Motor Club.

No. 37.—Charles G. Wridgeway, c. o. Peerless Motor Car Co., New York. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Peerless car of 30 horsepower. Four in party. Automobile Club of America.

No. 38.—Arthur L. Rich, c. o. Lozier Motor Co., New York City. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Lozier car of 40 horsepower. Four in party. New York Motor Club.

No. 39.—L. F. Braine, New York Motor Club. White car, 18 horsepower. Buffalo to Bretton Woods. Non-contestant.

No. 40.—J. G. Cassatt, American Automobile Association, White car, 18 horsepower. Buffalo to Bretton Woods.

No. 41.—C. C. Kirkham, 25 Broad St., New York City. Buffalo to Bretton Woods. Will contest for Glidden Trophy. Maxwell car, 16 horsepower. Four in party. American Automobile Association.

No. 42.—Sidney S. Gorham, Secretary A. A. A., New York. Winton car, 30 horsepower. Committee car. Buffalo to Bretton Woods. Non-contestant.

No. 43.—Frank Teitsch, Chicago, Chicago A. C. Peerless, 30 horsepower. Buffalo to Bretton Woods. Non-contestant.

No. 44.—George W. Beach, Hartford, Hartford A. C. Packard, 28 horsepower. Non-contestant; member of committee. Buffalo to Bretton Woods.

No. 45.—T. F. Moore, New York, New York Motor Club. English Daimler, 30 horsepower. Buffalo to Bretton Woods.

No. 46.—H. A. Grant, American Automobile Association, c. o. Maxwell-Briscoe Motor Co., Tarrytown, N. Y. Maxwell runabout, 10 horsepower. Buffalo to Bretton Woods. Non-contestant.

No. 47.—J. L. Snow, Boston. Bay State Automobile Association. Peerless, 30 horsepower. Buffalo to Bretton Woods.

No. 48.—J. A. Laughlin, 3d, Cleveland, Ohio. Cleveland, 35 horsepower. Buffalo to Bretton Woods.

There will be a number of cars devoted to watching the welfare of the tourists and making their touring pleasant. The following entries are what might be termed utility cars:

No. 76.—Tom Fetch, c. o. Packard Motor Car Co., Detroit. American Automobile Association. Packard, 28 horsepower. Patrol car.

No. 77.—E. L. Cutler, Springfield Mass., c. o. Knox Automobile Co. Knox baggage wagon.

No. 78.—Superintendent's car. Oldsmobile Model S, 32 horsepower.

No. 80.—Advance car, Maxwell, 16 horsepower, J. Schreyer, New York Motor Club.

Walter C. White's White car will act as confetti car; Paul H. Deming's White and Sidney S. Gorham's Winton will be press cars.

JERSEY ENFORCES NEW LAW.

Philadelphia automobilists who started out on Sunday, July 1, for a run to the seashore across the Jersey plain, expecting that the new automobile law would not be severely enforced, made a mistake, and they kept their licensing agent busy. More than 200 arrests were made between Camden and Atlantic City by country constables. They took the offenders before some waiting magistrates who immediately began to impose fines.

Each machine has to be registered, and the registration certificate shown on demand. The fact that a machine is registered does not entitle any one to drive it except those who are licensed. One effect of these provisions is to get the owner into trouble, even if he has a chauffeur who is licensed. If the chauffeur is not licensed then both the owner and driver are liable to fines. This was the case in most instances on Sunday. Frequently a car was not licensed. Then the owner was fined.

If the chauffeur had failed to register and be licensed he was fined also. In many cases the owners registered their machines, but their drivers failed to obtain licenses. Again some men were found driving cars of greater power and speed than the permits called for. That let the driver in for a fine.

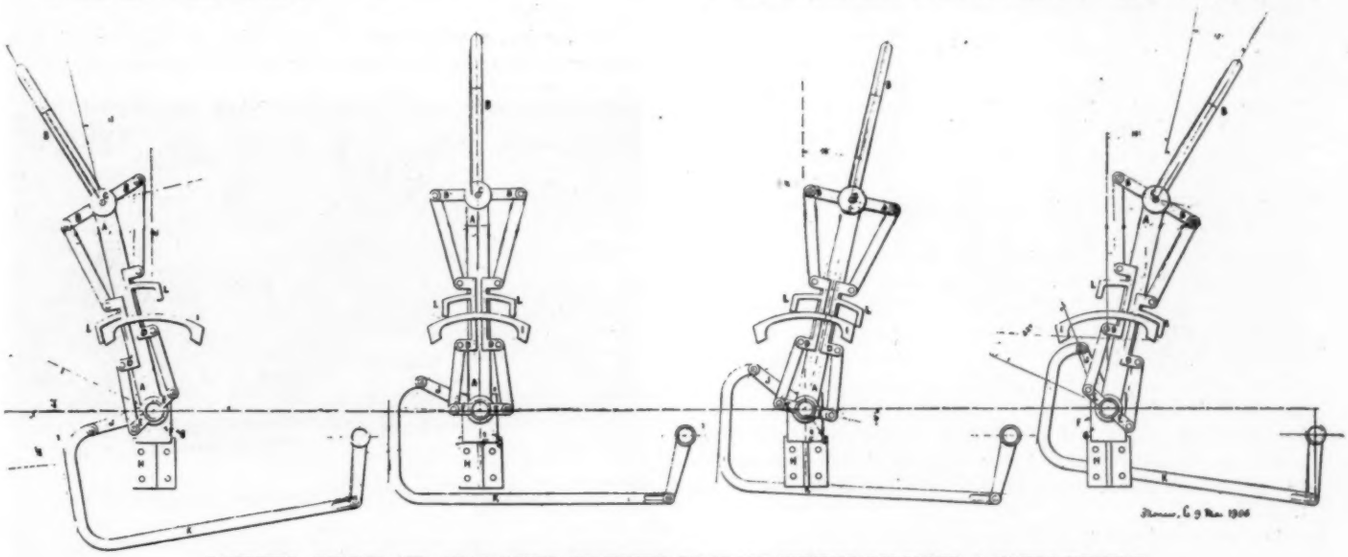
A COMBINED CLUTCH AND GEAR LEVER

SERGE VINCENT BOLOTOFF, an 18-year-old son of Princess Wiazemsky, of Russia, thinks he has solved the problem which has so long been agitating the minds of many prominent automobile engineers. He has designed, made and put into daily use a change-speed lever, which, he claims, does away entirely with the customary clutch pedal and eliminates from the mind of the driver all anxiety on the score of the movements of the speed change lever in conjunction with the clutch, when traffic is being negotiated or hilly country traversed.

The operation of changing gear is, as every driver will acknowledge, rather annoying. To pass, for instance, from second to third (or high) the following maneuvers are necessary:

1—Throttle down the gas.

2—Unclutch with the foot.



COMBINED CLUTCH AND GEAR LEVER, INVENTED BY SERGE VINCENT BOLOTOFF, A YOUNG RUSSIAN

3—Push the speed lever from second to third (or high gear) position.

4—Let the clutch pedal spring back (movement of the foot).

5—Open the throttle.

There should be a precision in these operations which is not always easy to realize, and which, in all cases, can be acquired only by constant practice where sliding gears are used.

As will be seen from the illustration, the Bolotoff lever consists of one principal lever surmounted by a second one, the two levers forming one whole piece, so long as the inclination in either direction does not extend beyond 13 degrees. This lever is so coupled up that when a change of speed becomes necessary, a movement of the lever first of all liberates the clutch and then slides the teeth of the gears into mesh, only allowing the clutch to get home again when the teeth are fully engaged.

An ordinary speed lever *A* is surmounted by a handle *B*, fitted with a double lever, and which is, in its extension, in an average position. At the neutral-point the lever is vertical, and, for all movements of an amplitude inferior to 13 degrees from the vertical, the two levers *A* and *B* form a rigid ensemble. As soon as the ensemble has moved through 13 degrees *A* comes to a stop and *B* can then turn on pivot *C* to a supplementary angle of 13 degrees. It is easy to understand immediately the aim of those two movements, distinct and successive—the former acts on the sliding gear in the speed box, the latter acts on the clutch. It is interesting to see how Mr. de Bolotoff manages to obtain that very desirable result.

The handle *B* is rigid with two small levers *b*, *b*, and on all that ensemble can pivot a jointed shaft *C*, which is binding upon the main lever *A*; then, in the second part of the maneuver above mentioned (when the handle turns on pivot at *C*) the two handles of small levers *b*, *b*, describe two arcs in opposite directions. Hence, one of the rods *D* comes down and the other goes up of a length equal to the chord of the above said arc. Those rods *D* are really two double cap links inserted in the main lever A and articulated at their lower part with a grooved scale fitted with a double fork E, sliding on a three-groove tube F and able to displace themselves longitudinally on said tube, together with the ensemble of the main lever. This main lever itself is fixed on a tube *G*, which slides also on the interior tube *F*, referred to above.

Lastly, the ensemble of the two tubes is supported by a bracket *H* fixed on the chassis of the car. That bracket supports a sector made of bronze *E*, on which are cut the notches corresponding to the different couplings of the gear box. The notches cut in the sector according to its superior generating allows a perfect guiding of the ensemble in the lateral displacement, because, in the example above described, we deal with a three-speed sliding-gear system; but it goes without saying that the realization will not be less easy in the case of any other sliding-gear. To conclude, the rotation of the three-groove shaft *F* causes also the rotation of the rod *G*, which rod, formed by another double-elbowed rod *K*, acts directly on the clutch.

BOARD AUTOMOBILE TRACK PROPOSED.

ATLANTA, GA., June 30.—A half-mile automobile track, built throughout of heavy boards, laid on edge, in construction and in banking of the turns exactly like an indoor bicycle track, is the latest project here. The idea emanates from the fertile brain of Jack Prince, promoter of everything promotable in a racing way, and builder of many bicycle tracks with high-banked turns. Prince has placed his scheme before the Park Commission and asked for a lease of Piedmont Park track for the purpose, agreeing to post a forfeit for the completion of his plans. Grand stands already exist there, which can be altered to suit requirements, and the proposed track will be a half-mile in length, banked 45 degrees at the turns and 30 degrees in the stretches. With such a track Prince thinks almost any speed would be possible with automobiles.

A SPLENDID TRADE SHOWING.

If documentary evidence is necessary to show that the automobile industry in the United States is of vast importance, the figures recently given by the Bureau of Statistics of the Department of Commerce and Labor are amply conclusive. The fiscal year ended on Saturday, June 30, and adding the probable volume of business between the giving out of the Departmental figures and the date mentioned, the manufacture of automobiles in the United States has amounted to presumably more than $26,000,000. The Bureau of the Census has recently issued a preliminary statement valuing automobiles manufactured in the United States in 1905 at $26,645,064. This includes amounts received for custom work and repairing and value of products other than automobiles; but as it does not include automobiles, valued at $879,205, manufactured in establishments engaged primarily in the manufacture of other products, it may probably be safely set down the value of automobiles produced in the United States approximates $26,000,000 and the imports $4,000,000, and that out of this total of $30,000,000 there was exported about $3,000,000.

The rapid increase in the use of automobiles is shown in a marked degree both by the figures of the Bureau of Statistics and those of the Bureau of the Census. The value of automobiles manufactured in 1900 is given by the census figures at only $4,748,011 and in 1905, as above indicated, at $26,645,064. The bureau of statistics' figures will show approximately $4,000,000 worth of automobiles imported in the fiscal year 1906, against less than $2,500,000 in 1905, about $1,500,000 in 1904, and about $1,000,000 in 1903.

Of the $3,000,000 worth of automobiles exported in the fiscal year just ending, about one-half goes to Europe, and most of the remainder to Canada, Mexico, the West Indies and Australia. The details of distribution have only been worked out for ten months of the present year, but they show the value exported to the United Kingdom at $616,177; to Canada, $435,850; to Mexico, $293,002; to Italy, $227,588; to West Indies and Bermuda, $224,676; to France, $170,601; to Australia and New Zealand, $148,124; to South America, $61,780; to Germany, $57,259; to British East Indies, $31,046, and to Africa, $26,925. Of the imports, fully two-thirds came from France and practically all of the remainder from the United Kingdom, Germany and Italy, in about equal proportions.

The industrial effect in the United States of the increased use of automobiles (while it cannot be fully measured because of the large number of people employed in their care, repair, etc.) is indicated in some degree by the figures of the census, which show that the number of wage-earners in the automobile-manufacturing establishments of the country increased from 2,242 in 1900 to 10,239 in 1905; that the wages paid increased from $1,320,658 to $6,178,950; the salaries of officials, clerks, etc., from $294,770 to $1,060,425; and that the materials used, which, of course, largely represent labor, increased from $1,804,287 to $11,658,138.

Reports from United States consuls and others have shown the practical application of automatically propelled vehicles in many of the comparatively undeveloped countries, especially in the tropics, including Mexico, the West India Islands, South America, Africa, India, the Malay peninsula, Java, China, Japan and the Philippine Islands, all of them sections in which animal power for transportation is extremely scarce and development delayed by reason of that scarcity.

The proportionately large exportation of automobiles to sections of this character is a suggestion of the practical uses apparently being made in those countries of this class of vehicles. About 20 per cent. of the automobiles exported from the United States in the year just closing went to Mexico and the West Indies, while only about 7 per cent. of the other exports went to those countries.

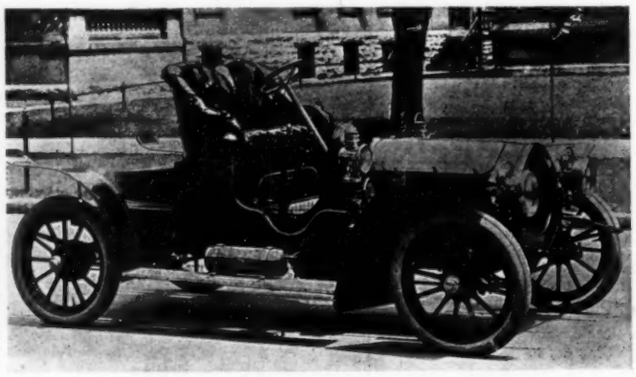
The export trade in automobiles has advanced rapidly in recent years and suggests a probably rapid growth in the near future. The total value of automobiles exported from the United States in the ten months ended with April, 1906, was $2,473,207, against $1,876,063 in the corresponding months of 1905 and $1,542,535 in the corresponding months of 1904, and thus indicates that the automobile may take the place in our export trade of bicycles, of which the exportation has fallen from $7,005,323 in 1897 to $1,378,428 in 1905. The exports of automobiles from France were, in round terms, $10,000,000 value in 1903 and $20,000,000 in 1905.

ANOTHER AIR-COOLED RUNABOUT.

INDIANAPOLIS, IND., July 2.—It has been announced by the Premier Motor Manufacturing Company of this city that it would place on the market immediately a new runabout, a model of which has just been completed and was exhibited Saturday for the first time.

In a number of respects the runabout is built after the design of the Model L de luxe, a touring car model brought out by the company some time ago, and in design is especially attractive. It gives promise of becoming a popular model among physicians, for whom it was designed especially. The motor is 24 horsepower, of the Premier air-cooled type, and is the same as is used on the Model L touring car. It has four cylinders and it is said that the light weight and high power will make the runabout unusually fast.

The car has a wheel base of 106 inches, 32 x 4-inch G & J clincher tires, shaft drive and selective type sliding gear transmission. The upholstering is of hand buffed, water grained leather and will match the finish of the car, which will be either Brewster green or carmine. The runabout has easy full elliptic springs, I-beam front axle and a full equipment of five lamps, horn and a generator.



PREMIER MOTOR MFG. CO.'S NEW RUNABOUT.

It is said that the car has been brought out because cars of its type seem to be increasing in popularity, not only on account of its good appearance and comfort of riding, but because excess load is eliminated and cross country trips can be made with the greatest economy on tires, fuel and oil, in addition to the advantage of case in handling. With cars of this type the rear of the frame can be arranged in many cases to take a separate tonneau, so that two or three extra passengers can be carried if necessary, and the tonneau need not be used when only two are riding.

TWO CONVENIENT MAPS FREE.

Alive to the requirements of automobilists, motorcyclists and wheelmen, the New York and New Jersey Telephone Company has prepared and issued two maps for road use. One of these covers Northern and Central New Jersey and the other Long Island, and in each the roads are indicated in such a way as to be of great use to the tourist. The maps are large and well printed, and fold into a small cover of a very convenient pocket size. Incidentally, the locations of telephone pay stations are marked along the various routes—which may be the salvation of some motorist *en panne*. The New Jersey map will be given free upon application at the company's Jersey City office, and the Long Island map may also be obtained free from the Brooklyn office of the telephone company.

A NEW IMPORTED (ITALIAN) CAR.

Arrangements have recently been made for the importation into the United States of an Italian car hitherto unknown here—the Isotta Fraschini, manufactured by the Fabrici Automobili Isotta Fraschini (F. A. I. F.), of Milan. C. R. Mabley, of the New York house of Smith & Mabley, Inc., has just returned from Italy, where he completed the necessary arrangements for the importation of the car, for which Smith & Mabley, Inc., will be sole agents for the United States and Canada.

The car is of the four-cylinder type, with pressed steel framing. Drive is through a multiple disk clutch and a four-speed and reverse sliding gear transmission to a countershaft, and final drive by double side chains to sprockets on the rear wheels. Countershaft sprockets are set low to facilitate the placing of the step leading to the side doors in an easily reached position. The radiator is of the honeycomb type, with round top, and the hood is smooth and well proportioned. Ignition is by the Simms-Bosch high tension magneto system. Gasoline is fed to the carbureter under air pressure. Brakes are water cooled.

There are three pedals, controlling the clutch, foot brake and accelerator; the foot brake and clutch are independent of the emergency brake, which is operated by the usual side lever. It is stated that a leading feature of the car is simplicity. The dashboard is noticeably free of attachments, giving it a clean, unencumbered appearance. Under the engine and extending backward nearly to the countershaft is a steel pan of semi-cylindrical shape, protecting the machinery from dust and dirt and from accidental damage. Springs are all semi-elliptic and long enough to give the car exceedingly easy riding qualities.

Mr. Mabley states that the ability of the car in proportion to its rated horsepower is very high; that the car is particularly strong on hill-climbing; and that it runs with unusual quietness. The engines are said to be unusually large for the rating under which they are sold.

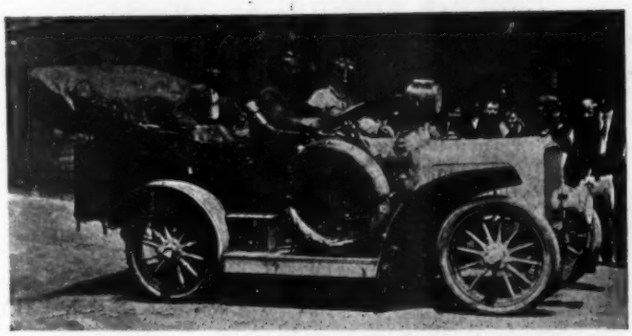
It is expected that several of the F. A. I. F. cars will be received in New York within a short time, to be used as demonstration cars and samples in preparation for the 1907 business.

NEW YORK AND BOSTON COMBINED TOUR.

Entry blanks are out for the combined New York and Boston tour, which is to meet the Glidden tourists at Bretton Woods, N. H., under the direction of the Bay State Automobile Association of Boston, and can be obtained from E. A. Gilmore, chairman of the runs and tours committee of the Bay State Automobile Association, 145 Columbus avenue, Boston, or from W. J. Morgan, Bratton Hall, Eighty-fifth street and Broadway, New York. The blank is a combination one, so that entries can be made for the tour and for the third annual White Mountains hill climb at the same time. The climb this year will be through the picturesque Crawford Notch, a few miles from Bretton Woods. The start will be at the historic Willey House, or rather the remains of same, as the house was swept away by an avalanche some years ago, all of the inmates being killed. The climb through the notch is one of the most severe tests that an automobile can be put to, but the 3 1-2 miles distance of the climb is not all steep grade, but where the grade is steep it at times measures up to 30 per cent.

Twelve events for machines listing from $850 and under, to $8,000 and over, are to be contested as well as a free-for-all and a light and heavy weight class, according to the rules of the American Automobile Association. The White Mountains annual climb is looked upon as one of the chief climbing tests of the year, and is participated in by drivers from all over the country.

Entries for the tour are coming in rapidly, and it is now certain that a goodly number of cars will start from New York, July 24, and the tour proper, when it leaves Boston the morning of July 26, will probably see the largest turnout of automobiles headed for the White Mountains that has ever left the Hub since the inauguration of touring.



E. C. CROSSETT, IN HIS TYPE XII, 35-40 H.P. POPE-TOLEDO.

Mr. Crossett is making a run from Davenport, Ia., to Amherst, Mass. The picture was taken in front of the Toledo factory, where Mr. Crossett halted for a few hours.

QUAKER CITY TRADE DOINGS.

PHILADELPHIA, July 2.—This is the season of the year when the dealer finds time to make changes, and there was a veritable surprise in this line when the Reo branch at the South Penn Square end of the Mint Arcade was abandoned and temporary quarters established in Room 309 of the Mint Arcade Building, pending the securing of new salesrooms. Meanwhile the Reo's growing clientele will do the bulk of its business direct with the new garage at 1627-29 Brandywine street.

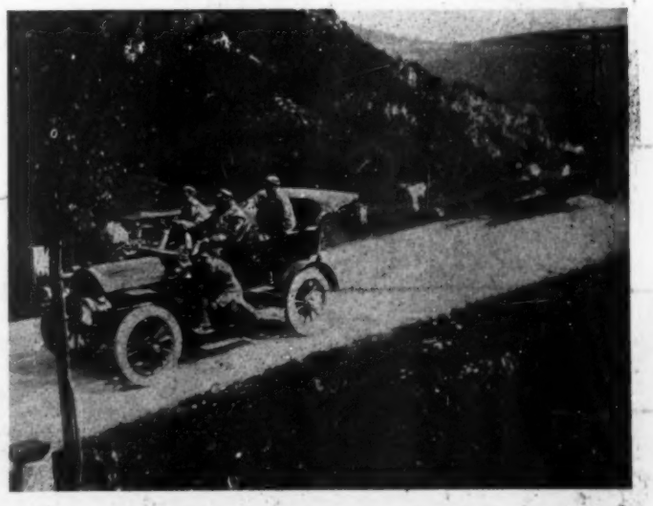
Another removal which came in the nature of a surprise was the invasion of "The Row" by the Gale, which now holds forth in handsomely fitted up quarters at 215 North Broad street.

W. H. Owens, manager of the Diamond Motor Car Company, announces the addition of the Babcock electric to the line handled by his concern, which includes also the Jackson and the Cleveland.

The Northern Garage, on Thirteenth street, above Westmoreland, Tioga, will open for business on Monday, July 9.

Local Peerless owners have been taking advantage of the presence here during last week of H. C. Nesbit, an expert from the factory at Cleveland, who is looking over their cars and making any necessary adjustments free of charge.

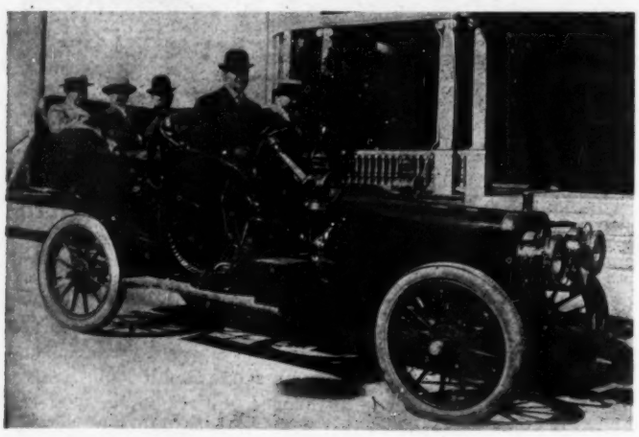
An elaboration of and change of plans by Thomas B. Jeffery & Co. provides for an entirely new building on the site just purchased at 207-209 North Broad street instead of the repairs and rearrangement originally contemplated. The old structure now on the ground is being razed, and upon it will be rushed to completion a three-story brick fireproof building extending to Watts street in the rear.



PERCY PIERCE IN PIERCE GREAT ARROW ON HERKOMER TOUR IN WHICH HE WON A GOLD MEDAL.

GENERAL FUNSTON AT TACOMA.

TACOMA, WASH., June 30.—General Frederick Funston's recent visit to this city was characterized by an almost continuous round of automobile trips, the principal one being to the American Lake district, where the Western troops, under General Funston's command, will encamp in August Automobiles were placed at his



GENERAL FRED FUNSTON IN 6-CYLINDER FORD AT TACOMA.

disposal, and he had but to give his instructions and go when and where he pleased.

In the illustration General Funston is seated in a six-cylinder Ford and beside him, at the wheel, is C. M. Seeley, the owner.

FROM SPRINGFIELD TO CINCINNATI.

Three Knox air-cooled touring cars left the Knox Automobile Company's factory in Springfield, Mass., on June 21 for a tour through Pittsfield, Albany, Syracuse, Rochester, Buffalo, Cleveland, Columbus and Cincinnati, where the tour was to end, the three cars having been sold to members of the firm of Schumacher & Boye, of Cincinnati, Ohio. The trip was laid out as a leisurely excursion, and there was no idea of racing or record-making. In the party, photographed just before leaving the factory for the journey, were Mrs. A. E. Schumacher, Mrs. Charles Lange, Miss Carla Lange, James Schumacher, Mrs. F. W. Boye, Jr., Mrs. C. O. Shepherd, Mrs. M. Wickersham, F. W. Boye, Jr., F. W. Thomas, Otto Remelin and Mr. Burke.

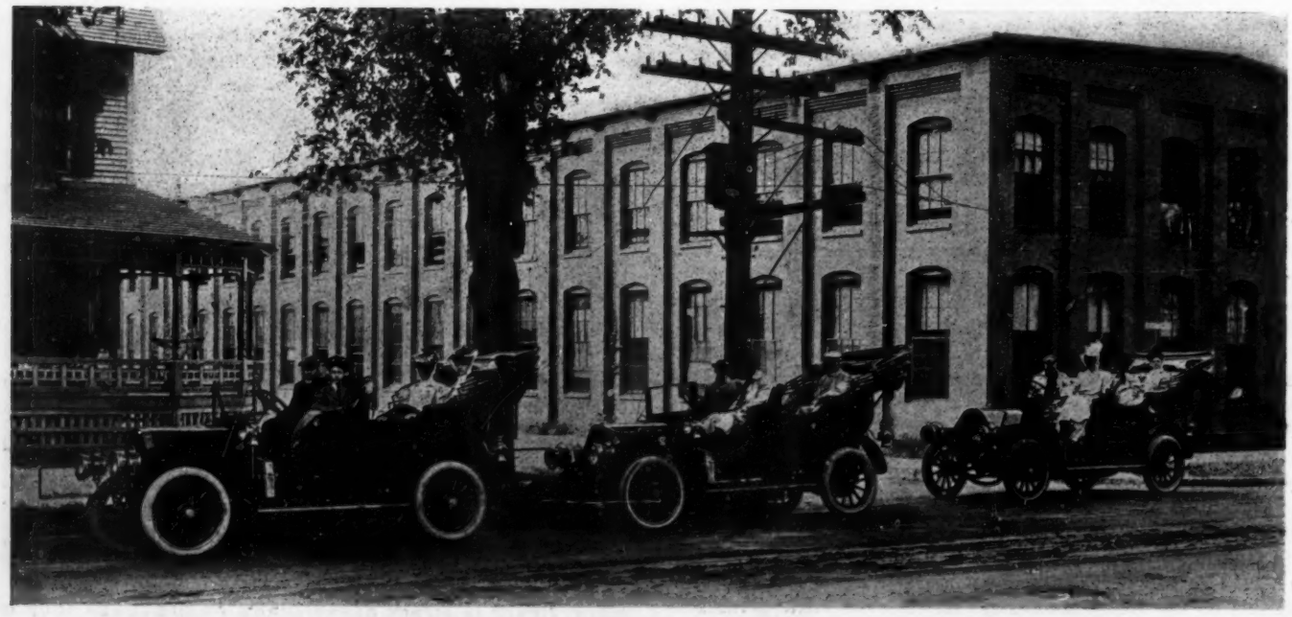
DETROIT'S AUTOMOBILE STATISTICS.

DETROIT, MICH., July 2.—That Detroit's claim to distinction as the automobile producing center of the country is something more than an idle boast is disclosed by an enumeration of the industries of that nature located here. At present there are no less than twenty automobile factories in Detroit, the list including the Cadillac Automobile Company, Ford Motor Company, Packard Motor Car Company, C. H. Blomstrom Motor Company, Reli-Motor Car Company, Wayne Automobile Company, Northern Motor Car Company, Aerocar Manufacturing Company, E. R. Thomas Automobile Company, Commercial Motor Vehicle Company, Detroit Auto Vehicle Company, Pungs-Finch Auto Company, Detroit Automobile Manufacturing Company, Reid Manufacturing Company, Wheeler Manufacturing Company, P. Dingman, Peter Desarranno, Huber Auto Company, Sommer Motor Company and the Delray Motor Works.

Exclusive of the Aerocar and Thomas plants, which began operations this season, the combined value of the output of these factories in 1905 amounted to the imposing sum of $9,944,075. The combined yearly capacity of the plants is approximately 18,000 cars. While last season's business was eminently satisfactory, the present year promises to far exceed all previous records. When it is remembered that the automobile industry in Detroit only dates back six years, and that it was not until 1902 that a footing was really gained, the development becomes even more striking.

Some interesting figures relative to the industry in Michigan are contained in the annual report of Labor Commissioner Malcolm J. McLeod, recently issued. The approximate cost of the thirty-four plants in the state January 1, 1906, was $2,284,800, the average annual capacity of all being 28,830 cars. Last year 13,702 cars were turned out, representing a value of $18,061,000. Ninety-six per cent. of the machines manufactured were designed for pleasure, the rest being for commercial purposes. Eleven per cent. of all the automobiles produced were shipped to foreign countries, Great Britain, Russia and Sweden taking the greatest number. In their production employment was furnished to 3,936 persons, the daily disbursement for wages, aside from superintendents, being $9,349.11.

Hastings, Nebraska, claims the distinction of having more automobiles in proportion to its population than any other city in the state. Lincoln is accorded second honors in this respect and Omaha third. It is said, however, that Nebraska automobilists are rather careless about registration.



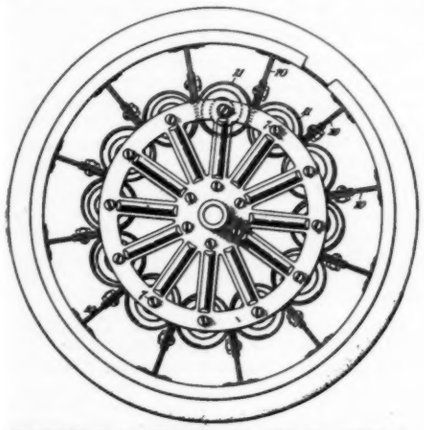
THREE KNOX AIR-COOLED TOURING CARS LEAVING SPRINGFIELD FACTORY ON RUN TO CINCINNATI.

Patents

Spring Wheel.

No. 823,529.—E. V. Hartford, of New York City, and A. W. Scheuber, of Hoboken, N. J.

The spokes *10 10* of the outer wheel are preferably stamped of flat strips in U shape,

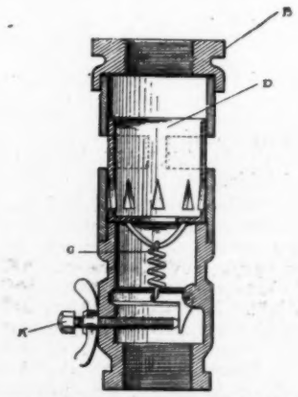


HARTFORD & SCHEUBER'S SPRING WHEEL.

and are bolted together two and two. The bend of the U forms a seating for the spiral springs shown (partly dotted), and the seating is completed by the bent strips *11 11*. The inner ends of the springs support the inner wheel by means of bolts *7*. Thus the wheel is cushioned as regards both the radial load and any torsional force that may be applied to it.

Auxiliary Air-Valves for Carbureters.

No. 823,185.—R. Miller, Jr., of Pittsburg, Pa.



MILLER'S AUXILIARY AIR VALVE.

This is a device intended for use with carbureters of the ordinary nonautomatic varieties, whereby they may be made to give constant mixture at different speeds. It consists essentially of a piston valve *D*, with a restricted opening in its head, whereby the air stream is sufficiently choked to cause the valve to be lifted against the tension of the spring *G*. The end *B* is connected to the engine and the lower end to the carbureter. As the engine speed increases *D* rises, owing to the suction, and more or less air is admitted through the triangular slots in the side of *D*. The spring tension is regulated by the screw *K*.

Solid Tire.

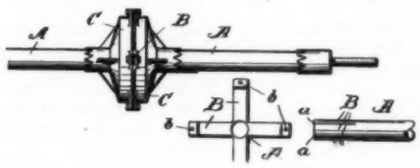
No. 823,839.—W. N. Wright and E. Carson, of Beaver, Pa.

A tire built up of disks slightly wedge-shaped and strung together on a sectional bent rod held to the rim by bolts. The disks are made of any suitable material.

Differential Gear Casing.

No. 823,524.—E. P. Gray, of Cincinnati, O.

This invention covers a simple form of skeleton casing formed out of the axle tubes themselves, which may be reinforced if desired by stamped or cast shells slipped over it and brazed in place. The axle tubes *A* have their inner ends split into four portions *B*, as shown in the detail sketches, and these



GRAY'S DIFFERENTIAL GEAR CASING.

are spread and drilled at *b* for bolts. The upper view shows the reinforcing shell *C*, which may or may not be used.

Agricultural Vehicle.

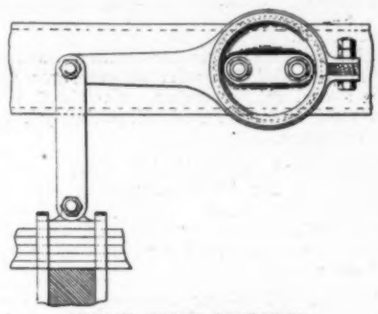
No. 823,719.—A. Froede, of Bautzen, Germany.

A three-wheeled tractor for plows, etc., whose chief claim to distinction is that the motor and transmission can be shifted bodily from right to left by a large screw, in order to place the weight where it is needed for traction.

Shock Absorber.

No. 823,829.—O. E. Vestal, of Pittsburg, Pa.

A friction shock absorber having a split ring, lined with leather or the like, gripping



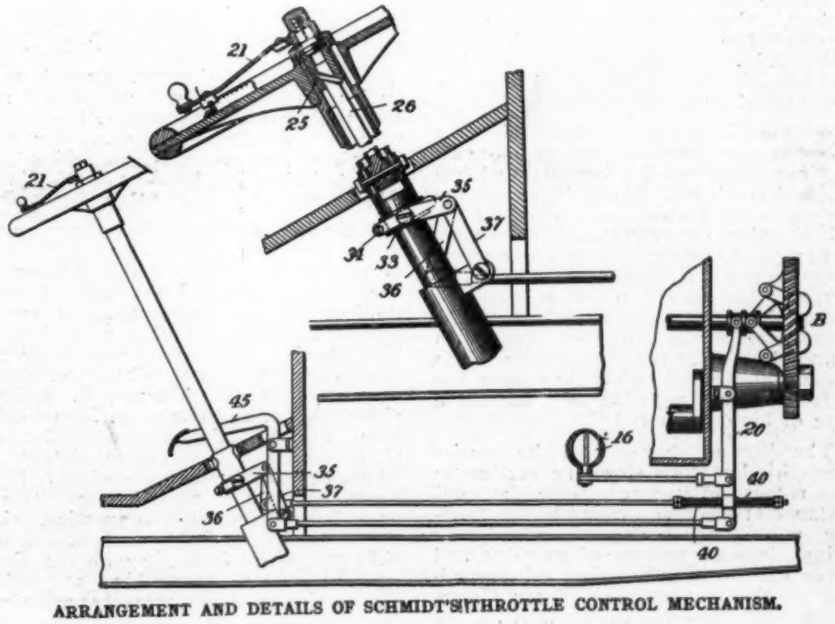
VESTAL SHOCK ABSORBER.

a drum bolted to the frame. The friction may be adjusted by a bolt at the split portion, and the leather renewed as desired.

Throttle Control Mechanism.

No. 823,742.—C. Schmidt, of Detroit, Mich.

This invention comprises a system of throttle control by centrifugal governor, combined with hand regulating means for the governor, and separate means whereby momentary acceleration or retardation may be had by a pedal. *B* indicates the governor and *16* the throttle valve, acted on by lever *20*. Direct interruption of the governor's action is performed by raising or depressing the pedal *45*. Adjustment of the governor, causing it to act at a higher or lower speed, is accomplished by means of the lever *21*, through which the bell crank *35 36* is moved to compress or relax the springs *40*. The lever *21* acts on an abrupt screw *25*, causing stem *26* and collar *33* to move up or down. The strap *37* simply affords a floating fulcrum to the bell crank.



ARRANGEMENT AND DETAILS OF SCHMIDT'S THROTTLE CONTROL MECHANISM.

NEWS AND TRADE MISCELLANY.

A carload consisting of fourteen Northern touring cars was recently shipped to the Diamond Motor Car Company, the Los Angeles, California, agency for that machine.

The E. R. Thomas Motor Company, of Buffalo, will have three cars in the elimination trial for the Vanderbilt cup race on Long Island in September. Each car will be of 115 horsepower and will probably have four cylinders.

Two Ford six-cylinder cars were shipped to the Ford agency at Berlin, Germany, last week. Over 3,000 of the four-cylinder Ford runabouts have already been contracted for, for European markets alone.

The Mitchell Motor Company, of New York, agents for the Mitchell automobiles and formerly known as the Mitchell Commercial Vehicle Company, has moved to 1,787 Broadway, the old quarters at 121 West Thirty-first street having been outgrown.

Charles M. Floyd, of Manchester, N. H., candidate for Governor of New Hampshire next fall and a strong automobile enthusiast, entered his 1906 Thomas "Flyer" in two events of the Granite State Automobile Club Hill Climbing Contest last Saturday and won both.

For the convenience of its customers in Syracuse and vicinity, also those motorists passing through Syracuse, the H. H. Franklin Manufacturing Company has recently completed a garage in connection with the factory, where every facility and convenience for the accommodation of customers will be offered.

W. W. Pickerill has purchased the third interests held by Lewis E. Younie and Arthur W. Hoffman in the Washington Automobile Company of Tacoma, Wash. This is the pioneer automobile business of Tacoma, having been started two years ago by Messrs. Pickerill and Hurley. The Hurley interest was purchased a year ago by the men who have now sold out.

The manufacturers of the Hartford shock absorber inform us nearly all the cars entered in the Grand Prix race recently run in France were equipped with shock absorbers, and that nearly half of them were Truffault-Hartfords. Nazarro's Fiat which finished second, all three Brasiers and Lancia's Fiat, which finished fifth, had shock absorbers of the same make.

Automobile trade conditions in San Francisco, at least so far as the sale of air-cooled Franklins is concerned, are in good condition. Since the recent catastrophe the Franklin company have received orders for five carloads from their dealer, G. A. Boyer. He recently wired the company at Syracuse that it would be necessary to deliver to him at least five more carloads before the close of the present selling season. Mr. Boyer has automobile quarters on Golden Gate avenue and the Franklin company has a factory man assisting him in taking care of his customers.

The Aerocar that carried the courier over the Kingston-Newburg section in the recent relay race covered a total distance of 279 miles, going to the meeting point and during the actual run using eighteen gallons of gasoline and three gallons of lubricating oil, according to the statement of Percy Owen, the general Eastern salesmanager for the Aerocar Company, of Detroit. The roads were in awful condition, mud being hub deep in some places. Several farm wagons were passed, abandoned on the road. Under these conditions the average of 15.5 miles per gallon is a good one.

Work has been started by the American Motor Car Manufacturers' Association to compile a complete list of automobile dealers and garages in America. By a rather novel system of investigation it will be possible to soon have ready a list that will not alone tell the name of the concern, but the cars handled and other particulars that will be of value to those holding membership in the big organization of motor car builders. Believing that business in other parts of the world is opening up for American makers, the firms in foreign countries will be classified in the same way, so that foreign agencies can be established.

At the suggestion of a customer who intended touring in a country where gasoline is very expensive, the Electric Vehicle Company, of Hartford, has experimented with a new carbureter arrangement. The result was a combination of two carbureters, one arranged to feed the motor with the smallest possible quantity of fuel, to be used when running without load, and the other feeding the usual quantity, to be used when doing work. Separate levers give control of the two feeds. It is stated that the carbureter was tested in connection with a 40-45-horsepower Columbia motor on the block, the motor being run three hours under load driving a dynamo, then three hours light and so on alternately with and without load for several weeks, after which it was installed in its car.

Edwin L. Thomas, of Buffalo, who recently sailed for Europe, took with him a 50-horsepower Thomas car, with which he will travel through Europe on a three months' trip. He has entered the car for the big speed contests on Ostend Beach during August. The car will be driven by Victor Le Meaux, who, despite his foreign-sounding name, is an American born. The Ostend races bring together many of the best stock touring cars of foreign manufacture, and the Thomas car will meet the best of its type of French, German, English and Italian machines. Mr. Thomas will return to America in September in time to witness the elimination trials for the American team in the Vanderbilt Cup race, and also the big event itself, which will be run early in October.

A number of changes have been made in the board of directors and in the list of executive officers of the Witherbee Igniter Company, of 541 West Forty-third street, New York, manufacturers of storage batteries and ignition specialties. The board of directors is now made up as follows: Thomas S. Witherbee, president New York; Allmand B. Elliott, vice-president and treasurer, New York; Wm. Barret Ridgely, comptroller of U. S. currency, Washington; Albert A. Blow, consulting mining engineer, New York. William H. Reed, formerly treasurer, has severed his connection with the company, and Allmand B. Elliott, E.E. and M.E., formerly with the General Electric Company, has succeeded him as vice-president, treasurer and electrical engineer. The company has organized an engineering department and H. H. Cooley, formerly of Cooley & Co., electrical contractors, has been appointed manager of contracting and marine lighting.

NEW AGENCIES ESTABLISHED.

Louis Ohnhaus has been appointed Oldsmobile agent at Fort Wayne, Ind.

The Manchester Auto Machine Company, Limited, is a new concern located at 1516 Locust street, Allegheny, Pa., where they will conduct an automobile and general repair business.

The Colonial Automobile Company, Pittsburg, Pa., will hereafter represent the Baker Motor Vehicle Company. The Colonial Company has also secured the agency for Crown runabouts, manufactured in Detroit.

The Duff Manufacturing Company, of Allegheny, Pa., manufacturers of the Barrett jacks for automobile and other work, has opened an office in the Havemeyer Building, 26 Cortlandt street, New York. George A. Edgin is in charge.

The Elmore Manufacturing Company, Clyde, O., has closed a deal with the Wilkinsburg (Pa.) Automobile Garage, whereby they will represent them in the Pittsburg territory. This make of cars was handled in Pittsburg last season by the King & Larimer Company.

Arrangements have been made between the Babcock Electric Carriage Company, of Buffalo, N. Y., and the Diamond Motor Car Company, of Philadelphia, whereby the latter will handle the Babcock electric vehicles in Philadelphia and the vicinity. The Diamond company has a large garage equipped with charging plant and other facilities for handling electric automobiles.

PERSONAL TRADE MENTION.

Richard Bacon, who has for some time been connected with the George A. Crane Company, of Chicago, has been engaged as salesman by the McDuffie Automobile Company, of Chicago.

H. J. Newman has resigned the assistant superintendency of the Dayton Motor Car Company, of Dayton, O., and has accepted the office of superintendent of the Pennsylvania Auto Motor Company, of Philadelphia. Mr. Newman will continue to reside in Dayton until the fall, when he will move to Philadelphia.

J. H. O'Brien and J. C. Spiers, both well known in the automobile world, have been appointed respectively general manager and superintendent of the Wayne Automobile Company, of Detroit, Mich. Mr. O'Brien has for the past two years been acting manager of the Ford Motor Company, of Detroit, while Mr. Spiers was with the Autocar Company, of Ardmore, Pa., previous to which he was prominent in the bicycle business.

F. S. Corlew has resigned his position as sales manager of the Oldsmobile Company of Boston, and has organized the Dragon Automobile Company for the purpose of manufacturing, the factory to be in Detroit, Mich. A four-cylinder gentlemen's roadster, shaft drive, sliding transmission, wheel steer, 20-24 horsepower, and a light touring car, on the same chassis, will be built for the 1907 trade. The company expects to have demonstrating cars on the road about August 15. Mr. Corlew will have entire charge of the sales department, with offices in Detroit and Boston.